THE PRACTICAL PHOTOGRAPHER

(LIBRARY SERIES)

EDITED BY REV. F. C. LAMBERT, M.A.

NUMBER 7

The Pictorial Work of
Robert Demachy.

After-Treatment of the Negative.

Fixing.
Intensifying.
Clearing.
Defects.
Washing.
Reducing.
Redevelopment.
Stains.

200 FORMULÆ.

Mounting Competition.
Print Criticisms.
Etc.

PRICE 1/- NET

HODDER AND STOUGHTON,
27, PATERNOSTER ROW, E.C.

April, 1904.

The Practical Photographer.

Library Series. The After-Treatment of the Negative. No. 7.

Principal Contents.

Illustrations.

Editorial and other Notes.

Contents of Our Next Number.

The eighth number of the present (Library) Series of *The Practical Photographer* will deal with the widely popular subject of **Hand Camera Work.** (*Ready May 1st.*)

Our Ninth Number will deal fully with **Platinotype and Allied Processes.** *(Ready June 1st.)*

Other Numbers in active preparation will be devoted to **Carbon Printing, Architecture, Portraiture, Landscape, Retouching, Gum-bichromate, etc.**

Hints for Intending Contributors.

The Editor will be pleased to carefully consider MS. bearing on any of the subjects announced. Preference will be given to MS. characterised by the following features :—

1. New or little known methods; formulæ personally tested.

2. Short sentences and simple language, with diagrams when needed.

3. Brevity so far as is consistent with clearness. The first and last pages of the MS. should bear the sender's name and address. The approximate number of words should be stated. Contributors may, if they please, send a brief outline or synopsis of their proposed contribution.

The Editor cannot undertake any responsibility whatever in connection with MS., but if stamps are sent for return postage, he will endeavour to return as quickly as possible any MS. not accepted for publication. MS. should reach the Editor not later than **six weeks** before date of publication.

Intending contributors will also find that it saves themselves trouble if they will send to the Editor an *outline* of their proposed communication at the earliest possible date, so that arrangements may be made to avoid overlapping by two or more contributors saying the same thing. In this first communication any proposed diagrams may be merely rough sketches.

In general it is well to put any drawings or diagrams on separate sheets, and not interpolate them with the matter.

The MS. pages (which may preferably be typewritten) should have a clear margin of quite an inch left blank along the left-hand side of the page.

NOTE.—It would frequently save disappointment and the return of MS. if authors would state their willingness for extracts to be made from their contributions if the contribution cannot be accepted in its entirety owing to overlapping or duplication of portions by other contributors.

Criticism of Prints.

It is our intention to make the criticism of prints a special feature in our pages. The Editor will give his personal careful attention to this matter, and will aim at making every criticism a practical, interesting, and instructive object-lesson. By paying attention to the hints thus given, often a poor print may be improved and a good print followed by one still better. In order to encourage readers to take great care in the preparation of the prints they send us, we shall offer **Three Prizes of Five Shillings** each for the three best prints sent in each month. The winning prints will not be returned.

Champion Class Competition.—Preliminary Notice.

We are arranging a novel competition which will only be open to those of our readers who have obtained a place on the Roll of Honour as winners of our Medals, Certificates, Print Criticism Prizes, or Honourable Mention. This competition will take place towards the end of this year. Due notice will be given.

Mounting Competition: Award List.

We have been very much gratified by the result of our Mounting Competition. The number of prints sent in considerably exceeded our expectations. The average quality was remarkably good; and we were glad to find that a considerable number of the competitors had gleaned hints from our Number 4; which volume, by the way, has—by a very critical and competent judge—been pronounced to be the best book ever published on this group of topics. The winners were pressed very hard indeed by several competitors, and we can offer our congratulations to all whose names are here below given:—

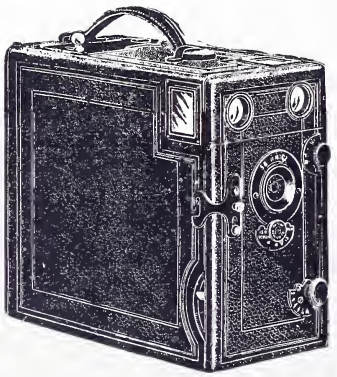
Silver Medal: W. Weaver Baker, "An Orchid." Bronze Medal: S. B. Lupton, "A Ray of Sunshine." Certificate: Zeph Carr, "Silent Watchers of the Night." Extra Bronze Medal: W. B. Topping, "The woodlands fair." Highly commended: J. Brooks, J. Bacon, J. Forrest Wilson, R. P. Dowson and S. W. Millner.

Print Criticisms: Awards.

The prints sent in during the month of February were not quite equal in number to the average of the previous months—possibly the effect of the recent holiday time. The average quality was quite equal to other months. We are very glad to find increasing care being given to mounting and titling. The three prize-winners show signs of considerable pictorial taste, though, of course, their prints are not beyond the pale of criticism. The three monthly prizes fall to H. B. Cookson, "The Village Smithy"; E. F. Oakshott, "Practice"; and Miss C. E. Few, "Roses." The following are highly commended:—C. B. Alexander, C. C. Lambert, W. H. Gale, Miss Ingle, F. G. Price. J. Malcolmson, Miss Leith.

Two Prints for criticism reach us without any name or address of sender and without stamps for return. One is entitled "South Doorway, Southwell Cathedral," the other is a landscape entitled "Solitude." Both prints are of good technical quality, appropriately mounted with neatly inscribed titles.

Too late! Too late!!—Each month brings us entries for our various competitions which arrive one or more days late. Will competitors please understand that the printing press, like the tide, waits for no one! and we are reluctantly *obliged* to pass over these late arrivals. On several occasions these late arrivals would have been prize-winners had they reached us in time.



Special Competition.—Coupon B.

Prize—A 1904 No. 0 Midg Camera

(known as "The King of Guinea Cameras").

1. Prints may be of any size or process, mounted or unmounted, and must show one or more **Human Beings.**
2. Marks will be assigned for pictorial as well as technical work.
3. The Editor reserves the right to reproduce any print sent in.
4. Competitors must send one, two or three (but not more) prints, accompanied by this coupon, and addressed "THE EDITOR, *Practical Photographer* (Midg Camera Competition A), 27, Paternoster Row, London, E.C."
5. Prints for this competition must be sent in before the first of May, 1904.
6. Prints will not be returned.

P.S.—For description of Prize Camera, see p. xi., *The Practical Photographer*, No. 6.

This Coupon Expires April 30th, 1904.

THE PRACTICAL PHOTOGRAPHER. COUPON No. 14.

Prints for Criticism.

RULES.

1. Write legibly, on one side of the paper only.
2. Put your name, address, and a number on the back of each print, and enclose this coupon.
3. Do not send more than three prints with one coupon.
4. State the *Month*, *Hour*, *Light*, *Plate Speed*, *Stop*, *Exposure*, *Developer*, *Printing and Toning* process employed.
5. If prints are to be returned, a stamped and addressed label or envelope *must* be sent **with the prints.**
6. The Editor reserves the right of reproducing any print sent in for criticism.
7. Prints should be addressed:—THE EDITOR OF *The Practical Photographer* (Print Criticism), 27, PATERNOSTER ROW, LONDON, E.C.

THE PRACTICAL PHOTOGRAPHER. COUPON No. 15.

After-Treatment Competition.

Name .....

Address .....

.....

.....

WRITE LEGIBLY.

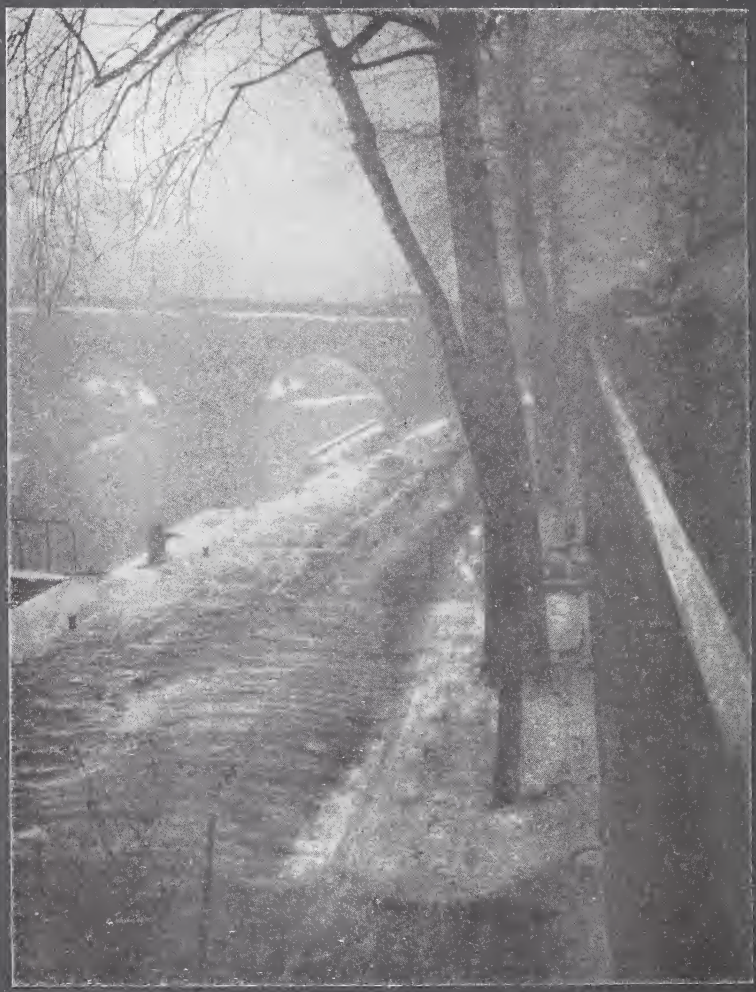
This Coupon Expires May 31st, 1904.

After-treatment Competition.

A Silver and Bronze Medal and Certificates will be placed at the disposal of the Judges.

1. This competition is designed to draw attention to the After-Treatment of Negatives.
2. Prints from the negatives and not the negatives are to be sent to us.
3. The Winning Prints will not be returned. Others will be returned *if* a stamped and addressed envelope or label be sent **with the prints** and coupon in this number.
4. Two prints must be sent. One from the negative before treatment, the other from the improved negative. (Or two negatives which have had identical exposures may be used). *Vide* various pairs of Prints in this volume.
5. Competitors may submit *two* pairs of prints, but the subjects must not be identical in the two pair.
6. A detailed account of the After-Treatment must accompany the prints.
7. The prints may be by any process, mounted or unmounted.
8. Prints may be sent in any time to reach us not later than June 1st, 1904, addressed:—

The Editor of *The Practical Photographer*,
(After-Treatment Competition),
27, Paternoster Row, London, E.C.



Winter.

THE PRACTICAL PHOTOGRAPHER.

Library Series. No. 7.

The Pictorial Work of Robert Demachy.

By THE EDITOR.

MONSIEUR ROBERT DEMACHY is undoubtedly one of the important factors in the fashioning of modern photography, and is known to all men as an expert in that best-abused or most be-praised of printing methods *viz.*, the gum-bichromate process—"according to the taste and fancy" of the speaker. Be that as it may, we shall have the critic with us in one matter, *viz.*, that this process has qualities and characteristics which are not shared by any other in general use at the present time. Indeed it may be said that it is just this point about "gum" that attracts some as strongly as it repels others. In a word it is a photographic process which is especially marked by its *un*photographic character, using this adjective in its more familiar sense as connoting sharp definition, exact rendering of the negative, freedom from control, manipulation, dodging, faking.

To discuss the pros and cons, the legitimacy of control, etc., would almost certainly leave both writer and reader *in statu quo ante*, and therefore will not be attempted. But just

this much may be here asserted, *viz.*, that a gum print permits—lawfully or unlawfully as opinions may have it—a greater degree of treatment, control, or alteration of the print than any other process. This conceded, it follows that a skilful worker in this process is able—at his will and pleasure—to emphasize this or suppress that. In other words it is *par excellence* the printing process for the worker who desires to depart from "the usual thing" as we now interpret that familiar photographic phrase.

Mons. Demachy, in one of his lucid papers, puts the matter in brief.

"I sincerely hope that no photographer who is better satisfied with his results on gelatino-chloride, albumen, salted paper, platinotype or carbon will take it up." And again. "The process is essentially destined to the dissatisfied photographer, to the clan of the malcontents, to those who are not pleased with their actual work."

"The gum bichromate process can only be useful to those photographers who are able to judge their prints as an artist would judge an engraving or a monochrome painting, and who have learnt outside photography and by the sole education of the eye what is right and what is wrong, what is good to show and what is still better to hide."

"Lastly, we can admit that it is worth while to master its difficulties, but only if we are decided to use it for our special branch of photography—that of picture making."

These three or four sentences give us precisely the key of the position from which we must view the reproductions of Demachy's work herewith given if we would try to see eye to eye with him. If the spectator approaches a process or method, with which he is not technically familiar, in a frame of mind saturated with pre-conceived standards and touch-stones, he can hardly expect to form any just or sound estimate of its merits or demerits. Also it is essential that he be equally open-minded as to the aims and intentions of the artist. Photographers especially require occasionally reminding of this. For with them there is a strong and dangerous tendency to

set up standards for this, limits for that, and to insist upon a "technically perfect" negative or print.

The so-called technically perfect print or negative, of course, has its proper place and value. But to carry standards of measurement from one domain to another is as absurd as to attempt to measure music by the mile or poetry by the pint. On matters of colour we may be pardoned if we decline to attach weight to the opinions of a colour-blind person. May we not, without offence, lightly pass over the dicta of those of our friends who candidly say "I am not an artist, but I know a good picture when I see one"? Is not this equivalent to saying that pictures may be estimated in worth by a set of rigid rules, or perhaps by *one* rule, *viz.*, the imitative presentation of natural objects. Of course all graphic art is *primarily* based on the representation of visible objects, an appeal to the mind through the eye. But let us not forget that as words are only the ear-vehicle of thoughts, so pictures are but eye-vehicles of ideas. In both cases it is the thoughts or ideas, not their vehicles that are of first importance. Let the reader contrast for a moment some word picture of a noble building with the architect's specification in feet and inches. The latter is the more exact, and is our "technically perfect" word picture, but to most of us the poet's picture is the one which is the more vivid and enjoyable, although it may be devoid of one single strictly accurate statement of size or detail, material or matter. Or we may contrast the workshop drawing of a railway locomotive with its counterpart in Turner's wonderful "Rain, Steam and Speed"—a picture which Mr. Monkhouse calls "the boldest attempt to represent abstract ideas that ever was made."

By the express desire of the Artist all the reproductions given in this volume are printed in black ink.

A Marken Girl.—In this print, we find an immediate and complete answer to those who overhastily assert that gum-bichromate cannot give fine detail. Look at the girl's head-dress and then bear in mind the inevitable loss due to the half-tone

process. The present writer, some years ago, conducted a series of experiments in connection with this process, and amply satisfied himself and many others who saw the prints, upon two of the then-disputed points, *viz.*, the matter of rendering fine detail and the limitation of the negative. Detail is a matter of what is in the negative, the smoothness or roughness of the paper, and the will of the operator. Therefore, once for all, let it be here said that absence of detail is not an inherent defect of the process, but a matter of choice on the part of the worker. The student will hardly fail to notice the telling touches of high-light on the shoulder, chest, and beyond the side of the left cheek.

Girl Reading.—If there is one thing more than another which makes or mars a pictorial photograph, it is tonality, *i.e.*, truthful rendering of relative values of light and shade. Unfortunately, this is one of the photographer's difficulties, because the ordinary plate sees colours, not as the normal eye sees them—as regards light and shade. This example well brings out the importance of tone rendering. Note the fur, drapery, flesh, hair, book, etc.

This print suggests to us a negative such, that had the worker been so disposed, he might have produced from it a platinum or silver print, technically good enough to pass the keenest "sticklers" for technique.

Portrait of Mlle. B.—Contrasting this with the two previously noted pictures, we see how truly flexible is this printing process. Here we have full and rich broad masses of shadow, with subdued middle tones. The treatment is broad and painter-like. Modelling is suggested, rather than given. The hand is wisely kept well-subdued, but yet adds an important note to the scale of tones.

Winter.—The title, if somewhat trite, is yet an exact echo of the first suggestion of the picture. The strongly-marked converging lines of the picture lead our eyes from foreground to distance—where under the arches of the bridge we see small but important touches of snow. "To every rule, an exception for him who can make the exception

PROFILE.

more serviceable than the rule." The somewhat high view point, with uprising riverside, is here compensated for by the position of the bridge in the middle distance. Imagine this part absent, and the picture would, as the painters say, "fall to pieces."

Profile.—One hardly needs any printed title for this, for we see at once that it is a profile study. The background is purposely treated in a simple and sketchy manner; the lower part of the picture left as a vague suggestion; the hair kept dark and quiet; part of the upper head omitted. All artful, but quite legitimate procedures, so that our undivided attention may be given to the graceful profile.

A Head.—Here again, we have another lesson teaching us the great value of quiet spaces. The usual thing is so terribly irritating with its plethora of trivial detail and uninteresting objects; so that we gladly turn the eye to these quiet spaces, just as we thankfully escape from the clattering, banging, ear-splitting noise of a vast factory, to some quiet, restful, shady nook. This example should teach the student something of that subtle difference between breadth and flatness, two things easily confused, but as different as character and caricature.

Autumn.—In this instance we have a full range of tones extending from black to white. The simplicity of arrangement is at once prepossessing, and this is emphasised by the human interest in the picture. Each year, the fading seasons and falling leaf reminds man that he too must fade and fall as a leaf from the great human tree. The figure, "in saddening contemplation bent," is a harmonious chord, and lifts us out of ourselves into the picture.

Alas, we find ourselves at the end of our space—but before closing the page we would send a hearty word of sincere thanks to the maker of these restful and refreshing impressions—peeps into some of the artist's chambers of thought. Different from the usual thing no doubt—perhaps not quite what some may have hitherto thought photographs ought to be like—yet are they not for that reason all the more interesting, refreshing, thought-suggesting and personal?

Introductory Note.

By THE EDITOR.

O not be in too much of a hurry about the choice of an intensifier or reducer. It is a good plan to take a print from the negative in all cases before any after-treatment is commenced, for it is not easy to be quite sure of the exact printing value of a negative by merely looking at it. Negatives are often full of surprises in this way. Select your process to suit the effect gained.

There are always three things to keep in mind: (1) The present condition of the negative. (2) The printing process it is to be used for. (3) The degree of change required.

Before trying any "experiments" or alterations of published formulæ, first give them a fair and careful trial.

In no case is harm done by thoroughly removing all hypo from the film. In a few cases very thorough washing is not necessary, but in many cases this is a condition of success.

It goes almost without saying that the plate must have been also thoroughly fixed. The beginner may be reminded that a plate is *not* thoroughly fixed the moment all milkiness is gone. It requires several more minutes after this in the fixing bath.

It is desirable to thoroughly free the plate from any trace of developer, or complications may arise. Hence the need for using a clean fixing bath, *i.e.*, one not contaminated by developers.

If the negative has been dried it is a wise precaution to soak it in plain water for at least a quarter of an hour before any wet after-treatment is commenced. It is well to remember when intensifying or reducing that a plate when wet does not look quite so dense as it does when dry.

When is Intensification Necessary or Useful?—(1) If the subject be markedly feeble in light and shade contrasts, *e.g.*, low relief carvings with a front light.

(2) Coloured objects that lack contrast in the negative, *e.g.*, a light red object against a dark green ground may show but little density contrast as compared with the colour contrast in the original.

(3) Where special emphasis is required, *e.g.*, a manuscript in faded ink on a discoloured paper or parchment.

(4) Correctly exposed negatives may not have been developed quite far enough for the printing process in contemplation.

(5) Over-exposure tends to reduce contrasts which may often be compensated for by suitable intensification.

(6) Under-exposed negatives with feeble shadow detail and general thinness.

When is Reduction Useful or Needful?—(1) The plate may be so dense that it takes an inordinately long time to print.

(2) The negative may have been made for one printing process and then wanted for another which requires less densities.

(3) The relative densities may be at fault, *e.g.*, the contrasts may be too strong for printing with P.O.P.—or may not be strong enough for carbon. By choice of suitable reducing agent, the relative densities may be modified considerably.

(4) Reduction is very useful in case of a negative suffering from general or local fog.

The reader must please bear in mind that it is always as well to have more than one opinion—or formula. Hence, there need be no surprise in finding in these pages, formulæ having different proportions of the same ingredients. Though the author's name is not given for each formula quoted, in all cases they are supported by experts whose dictum properly commands attention.

Furthermore, let not the reader be surprised if he fails to find herein every known method of altering the negative. Quite a considerable number—especially in the section devoted to local treatment—have purposely been passed over because they seem more properly to belong to a volume dealing with such matters as retouching, local control, sky printing and other matters of a non-chemical nature.

Introduction to Intensification and Reduction.

By R. W. COLE, B.A.

LET the reader first note the difference between under-exposed and under-developed negatives. (See *Practical Photographer*, No. 6, figs. 12 to 17). An under-exposed plate is thin all over, and lacks detail in the dark parts of the picture. If development is prolonged, there will be excess of density in the dark parts of the negative, but detail will still be wanting elsewhere. In the former case the print has sharp contrasts and heavy shadows; in the latter the contrasts are accentuated. A correctly exposed, but under-developed, plate exhibits considerable detail if looked at against white paper. The resulting print is pale and lacking in vigour, and if printed to excess, flatness is still apparent. In this case under-development may be more or less compensated for by intensification. This consists in adding, by chemical means, metallic or other matter to the silver image. Most under-developed negatives can be strengthened until the error is quite obviated. If there are trees or other objects wanting in isochromatism, they cannot be filled with detail.

Intensification is also used for making properly-developed and exposed negatives more "plucky" and "brilliant" for reproduction and other purposes, and strengthening detail for enlarging.

Mercuric Chloride Intensifier.—This is the most popular intensifier for making negatives more "brilliant," and is tolerably certain in action.

Negative should be perfectly free from hypo, alum, etc., and also stains, finger and grease marks, or the action of the intensifier will be uneven. If dry, the negative should be soaked in water for half an hour to soften the gelatine, and then placed in the following:—

A Marken Girl.

Mercuric chloride	5 parts.
Hydrochloric acid	1 part.
Water	100 parts.

The dish is continually rocked. The image gradually whitens owing to the change of silver to silver chloride and deposition of mercurous chloride on the film. At the same time the detail appears stronger in shadows. If only slight intensification is required, the negative is removed before bleaching is complete. If full result is required, it is left in until quite white as seen by transmitted light. It is now well washed in soft water (for hard water may cause stains), and then placed in the following :—

Ammonia	1 part.
Water	50 parts.

In this it gradually darkens, becoming brown and finally almost black. Blacker hue is obtained by using stronger ammonia. The negative is kept in the solution until all trace of whiteness has vanished, and again washed and dried. It will be seen, on examination, that the image is much strengthened owing to deposition of mercury on silver. Spots near the edges which will not intensify are probably caused by finger marks. Bleaching takes from five to ten minutes, and redevelopment with ammonia about three. Stronger ammonia makes the process more rapid, but this is not desirable. Partial intensification will affect the light parts of negative without much altering the rest. If the process is carried too far, the bleached or partially bleached plate is placed in 10 per cent. solution of hypo and carefully watched. When sufficient is dissolved, it is washed and transferred to ammonia solution. Uniformly thin negatives are the best for intensification. Negatives having sharp contrasts receive accentuation of detail, but dark parts become excessively black.

Other solutions for darkening. Diluted ammonia is quick and certain as a blackening (or redeveloping) agent. Most ordinary developers, especially metol - hydrokinone mixtures will do, though staining and uneven action sometimes result. The following is a good formula for inducing pluck, and negatives treated with it do not deteriorate :

Metol	30 grs.
Hydrokinone	15 grs.
Sodium carbonate	½ oz.
Water	20 ozs.

This takes nearly ten minutes for complete re-development The following solution is more rapid and also certain in results:—

Sodium sulphite	1 oz.
Water	5 oz.

The negative is well washed after re-development and dried as usual. Same procedure is applicable for plates and films.

Nitrate of Uranium Intensifier does not make the negative so "plucky" as mercuric chloride, but adds considerable density. The negative must be properly freed from hypo, or red fog will result. It is soaked in water for half an hour, and then placed in the following:—

Potassium ferricyanide	15 grs.
Uranium nitrate	12 grs.
Water	4 oz.

The dish is rocked. The silver image gradually stains an orange crimson. The negative is held up to light occasionally for examination, and when intensification is sufficient, it is washed in soft water. The process takes from ten to fifteen minutes. If general red fog appears, the negative should be removed at once. Tendency to fog is avoided by adding a few drops of acetic acid to the intensifying bath.

Reduction. *Difference between over-developed and over-exposed negatives* (See *The Practical Photographer*, No. 6, Figs. 12 to 17). Over-developed, but properly-exposed, plates exhibit abundant detail. They are very dense and require strong sunlight for printing. Over-exposed negatives are more or less fogged and not plucky. If developed to excess, more density appears, but fog increases. These negatives are improved by reduction. This consists in immersing in a solution which dissolves the excessive silver. Over-exposed, but under-developed, negatives are first carefully reduced until the fog is cleared. They are then washed and intensified.

Farmer's Reducer, which is very efficient, is as follows:

Ten per cent. solution of potassium ferricyanide	1 part.
Twenty per cent. solution of hypo...	10 parts.

The negative, if dry, is soaked in water for half an hour. It must be carefully watched during reduction, as the time required varies very considerably. If slight reduction is required, only a few drops of ferricyanide solution are added to hypo. If the process is not sufficiently rapid, a little more ferricyanide may be added. When reduction is complete, the negative is well washed. Local reduction of specially dark parts, halated windows, etc., is effected by immersing the negative in 20 per cent. hypo solution for a few minutes. It is then removed, and Farmer's solution applied locally with a brush. In two or three minutes it is replaced in the dish, and if the effect is not sufficient, the process is repeated. Local reduction must be carefully carried out to avoid excess.

The choice of a suitable Intensifying Process depends upon the condition of the original negative and the result desired.

Mercuric chloride followed by soda sulphite gives only slight additional general density, but tends to clear any fog-veil and give a slightly brighter negative.

Mercuric bromide followed by sulphite gives considerably more general density than the last-named process, and in like manner helps in clearing up any slight fog.

Iodide of mercury processes do not seem to possess any fog-removing powers, so that for clear and delicate detail requiring strengthening this process has advantages.

Wellington's silver process possesses the twofold character of clearing up fog and giving almost any desired degree of strength, according to the quantity of intensifier used and the time it is allowed to act.

Local Intensification.

By STANLEY C. JOHNSON, B.A.

AMONG our stock of negatives, there is but little doubt that some are of uneven density. This means that parts of them will print quickly and other parts slowly. Matt-varnish and stumping chalk are usually procured to assist in minimising defects of this kind, but local intensification is far ahead of these, and other such methods, in that its effects are permanent and more easily accomplished.

Having secured a negative that might be improved by this treatment, our first step is to rid it of all traces of grease. Otherwise, it will be found impossible to evenly apply the intensifying solution. We may do this by gently rubbing the whole of the film with a soft piece of ink eraser. This plan usually suffices, but if by any chance it should not prove quite effective when dealing with a much-handled negative, then more drastic methods must be adopted. The film should, in such cases, be subjected to a thorough cleansing with sapolio, or any of the usual household soaps.

Our next step is to soak the negative until it begins to frill around the edges. Afterwards the superfluous moisture is wiped away.

Two brushes of different sizes are now procured, the larger a number 5, and the other two sizes smaller. They should be cheap ones, as the chemicals quickly ruin them, even though they may be of the very best make.

The intensifier is then applied to those parts of the negative that are too thin, or, in other words, that print too quickly. The larger brush is used to apply the solution, whilst the smaller one is necessary for doing the outline work.

By slightly tilting the negative as required, it is possible to keep the solution flowing evenly up and down the portions being treated. It is also a simple

A Head.

matter to preserve a sharp outline; but if by chance some of the intensifier should run on to a part that it is not intended to touch, the whole of the film must be dried with a pad of blotting paper. The solution will then have to be applied afresh.

The accompanying illustrations will show how much it is possible to improve a negative. The intensifier was first of all painted over each of the tree trunks, special care being taken to prevent it from exceeding its proper limits. In less than five minutes sufficient density was obtained. The negative was then rinsed and quickly dried with blotting paper. Attention was next paid to the surrounding foliage. No particular outline being desired, the solution was alternately applied and washed off, for a minute or so, until the necessary effect was secured. The negative was thus completed in about ten minutes. *Vide* Figs. 27 and 28.

In the above case a weak uranium intensifier was used, but of course any other may be employed. The reader is advised, however, to use none other than his own particular favourite bath.

He should not be tempted to work with the intensifier in a concentrated form, even though it be applied with a brush. Disregard for this precaution will surely lead to irregular and patchy results.

The whole operation is so delightfully simple that, henceforth, uneven negatives should never be tolerated.

Relative effects of different Intensifiers.—Mercuric chloride and soda sulphite: gain only very slight.

Mercuric chloride and ferrous oxalate: moderate gain.

Mercuric chloride and ammonia: about equal to ferrous oxalate process repeated a second time.

Uranium: roughly equal to three repetitions of mercury and ferrous oxalate.

Mercury and Monckhoven's process: somewhat stronger than mercury and ammonia.

Lead and ferricyanide: stronger than uranium.

Cerium Peroxide Reducer.

By HERMANN LEA.

PEROXIDE of Cerium is a patent article put on the market in concentrated form, and is of a pale sherry colour. Essentially a selective reducer, it acts first of all, and more particularly, on the shadow portions of a negative, thus being especially useful in cases of over-exposure combined with over-development.

Simple and economic in use, it merely requires the addition of water, the proportionate strength varying with the effect desired. The action is rapid, though well under control, and is remarkably regular.

Characteristics. In its peculiar action on the shadows it has exactly the reverse effect to Ammonium Persulphate, but to ensure this selective quality it must be used in a strong form.

When very considerable reduction, as well as a heightening of contrast, is desired, the concentrated solution may be mixed with an equal bulk of water, and the *dry* negative placed directly therein.

For slight, or general reduction, the negative is soaked in water until the film is thoroughly saturated; it is then plunged in a bath consisting of one part of the concentrated solution to ten parts of water.

Limits. These two strengths may be taken to represent the practical limits, and intermediate proportions may be used according to the effect sought, bearing in mind the fact that, the stronger the bath the more accentuated will be the contrast, and *vice versa*.

In reducing an old negative, it is advisable to first thoroughly soak it, since if it is put in the bath dry the action may not be quite regular.

Local reduction is effected by applying the solution with a camel-hair brush or plug of cotton wool, care being taken to graduate the edges where the action is to terminate.

Intensification with Mercuric Chloride and Ferrous Oxalate.

By CHAPMAN JONES, F.C.S., F.I.C., F.R.P.S.

SIXTEEN years ago I first publicly drew attention to this method of intensification. Experience has shown that all the advantages that have been claimed for it exist in fact, and it appears to remain the only method that will produce an exact and definite effect. The modifications that have been proposed, such as the use of an alkaline developer instead of ferrous oxalate, all fail in this important matter.

The Negative is first bleached in a mercury solution prepared by making a saturated solution of mercuric chloride and adding strong hydrochloric acid to it in the proportion of half a dram to a pint or 3cc. to a litre.

The bleached negative is then thoroughly washed. If common hard water is used, such as one has in London, after about one hour's washing in slowly moving water the white image will begin to darken a little by reason of the action upon it of the substances contained in the water. This darkening is a sign that the washing is complete. It is well, though not necessary, to give the plate two or three changes of soft water before applying the ferrous oxalate.

The ferrous oxalate is prepared by pouring a saturated solution of ferrous sulphate into six times its bulk of a saturated solution of neutral potassium oxalate. The two saturated solutions are prepared beforehand and mixed immediately before use. The mixture is poured over the negative and allowed to act on it, with suitable rocking, until the image is thoroughly darkened, and then for a little longer to make sure of a complete action. The ferrous oxalate does not act as a developer, and the addition of any bromide or acid to it is detrimental, as they slow its action.

It only remains to wash the plate. If the first two or three washings are done with soft water so much the better, but it is not necessary. If a white precipitate is formed on the negative, the surface of the film may be gently rubbed under water with a plug of cotton wool to detach as much as possible. If any is visible after drying it will completely disappear on varnishing.

The advantages of this method are that it is exact. It is possible to tell exactly what its effect will be, or to tell from an intensified negative what the original was. I do not know of any other method of which this can be said. Chemically, every atom of silver in the image has added to it an atom of mercury. Optically, the opacity logarithm is multiplied by 1·45. A second intensification multiplies it again by the same figure, and so on. The character of the gradation of the original negative is exactly preserved. No detail is lost; the thinnest parts of the negative are duly intensified. The process can be repeated as often as desired on the same negative, so that any density can be obtained. The resulting image is *permanent.*

The only disadvantages of the method are that it needs a little more care, perhaps a little more skill, and it takes a little longer time to perform, than some other methods.

Stains.—A sufficiently dilute solution of potassium cyanide will be found exceedingly useful in removing various kinds of stains without materially affecting the image. The strength of the cyanide should not exceed 10 grains per oz. water, and half this strength is preferable. This agent will remove iridescent stains and fog so often seen round the edge of the plate. It will also affect the stains left by pyro, eikonogen, quinol, etc. N.B.—Great caution is required in handling this substance—solid or in solution—as it is a very powerful poison. The fingers should not be put into the solution.

Girl Reading.

Notes on the Transparent Paper and other Illustrations.

By F. C. L.

ITH the desire of helping the isolated beginner we are inserting three pairs of paper negatives to give some idea as to the general appearance or change produced by such after-treatment as intensification, reduction, etc. These paper negatives should be raised from the plain paper adjoining them. This plain paper should be held in a position so that it is well and evenly lighted. Then the negative is viewed by looking through it at the plain paper behind it, and due allowance made for the inevitable grain of the paper, and thinness of ink.

A. Negative before Intensification.—The negative is of too feeble contrast, but with abundant detail. This negative was very fully exposed, but not developed long enough for sufficient density contrast. The developer should have contained more bromide, and development been carried on for longer time. Fig. 12.

AA. Print from A.—Detail in the dark parts is just visible, but the picture lacks light and shade contrasts. If printing were continued the shadow in the detail would be lost and the high-lights become too dark. Fig. 15.

B. Negative after Intensification.—The densities generally are considerably increased and the contrasts augmented. Fine detail only just visible in A. is now more clearly seen. The change of density contrasts may be seen by comparing corresponding portions of the light wooden mill-house. Fig. 13.

BB. Print from B.—Comparing this with print AA., we see that while the high-lights are approximately the same, the shadow range is much longer without loss of detail by prolonged printing. The general effect is brighter and generally more harmonious. Fig. 16.

C. Negative before Reduction.—This negative received a minimum of practical exposure and development was unduly prolonged to illustrate the common mistake of supposing that prolonged development brings out detail. This may be the case, but density contrasts are at the same time augmented. Fig. 18.

CC. Print from C.—This shows an effect far too black and white. Though the scene is obviously a summer one, yet the white patches on ground, foliage, etc., are more suggestive of snow. Fig. 22.

D. Negative after reduction.—The contrasts of density generally are materially reduced and the printing range now more suitable for P.O.P. or similar printing methods. Fig. 19.

DD. Print from D.—The general effect is much more summer-like. And although one side of the Young Walton's face and figure are in strong sunlight, yet this is not now suggestive of snow. Fig. 23

(Note that in this picture we have the somewhat rare coincidence of shadows and reflections on the water. The two terms are frequently confused. The foliage to our left is seen reflected. The boy's figure is casting a shadow from right to left.)

E.—A negative over-exposed and developed with too much alkali—producing flatness and fog. Before intensification this fog must be removed as far as possible or it will become intensified, reducing contrasts and prolonging printing. Note the fogged margins of the plate. Fig. 25.

EE.—Print not unlike AA., shows flatness and general feebleness of contrasts. The negative prints somewhat slowly, and cannot be made to give a bright result in its present state. Fig. 29.

F.—Negative E. has been slightly reduced with ferricyanide and hypo—just enough to remove *very nearly* all the fog without materially removing the shadow detail. If *all* the fog had been removed some of the delicate detail would have gone with it. After washing the negative received moderate intensification. Note the clearer margins of the plate. Fig. 26.

FF. Print from F.—Generally the print is increased in light and shade contrasts and sufficient detail is preserved in the shadows. Fig. 30.

Theoretical Notes on Intensification and Reduction.

By T. THORNE BAKER, F.C.S., F.R.P.S.

IN this article I propose to deal with one or two general methods of intensification and reduction from a view theoretical rather than otherwise, and then to treat some of the less-known ways of intensification, which are of considerable interest to the practical photographer as well as to the photographic chemist.

Intensification may be described as an operation required to render an image more dense. The image in a gelatino-bromide negative consists of metallic silver in a black state. Nearly every known metal is black when in a fine state of division, but the same metal is frequently "blacker," that is, more opaque, in certain forms than in others. Thus a silver image obtained by means of developing exposed silver chloride is much more intense than could be produced by developing the same quantity of silver bromide per unit area. The importance of this phenomenon will be made clear later.

The commonest method of intensifying a weak negative or bromide print is to soak it first in a solution of mercuric-chloride—"corrosive sublimate"—$HgCl_2$, and, when bleached, to reblacken it by treatment with some secondary agent, such as ammonia or a ferrous oxalate developer. We must first, however, touch briefly upon preliminary washing, then upon the question, "What is bleaching?"

Presence of Hypo. It is essential that the film be free from hypo before treating it with *certain* intensifiers. To ensure this, after a sound washing in running water soak the plate for ten minutes in one of the following :—

(i.) A 2 per cent. solution of hydrochloric acid.
(ii.) A weak solution of hydrogen peroxide.
(iii.) One of the many hypo eliminators, such as iodosal, anthion, etc.

When mercury or copper is used as the bleaching agent, it will always be noticed that a chloride, bromide, or iodide is employed. Thus mercuric-chloride will convert the silver image into one of silver chloride or silver mercury-chloride. We have only got to bear in mind that both silver and mercury chloride(s) are white, when the meaning of the term "bleaching" is at once obvious.

It will be useful to divide the formulæ given below into two series, of which mercury forms one type and uranium another.

The plate, having been thoroughly washed as above indicated, may be bleached in the following solution :

Mercuric-chloride	4 gms.	or 60 grs.
Ammonium chloride.....	4 gms.	or 60 grs.
Water	120 cc.	or 4 ozs.
Hydrochloric acid	1 cc.	or 10 drops.

The change is not a sudden one; the black image gradually turns grey, and by light reflected at a large angle it ultimately appears quite white. It should then be again thoroughly washed for ten or fifteen minutes.

It is during the reblackening of the image that intensification is produced, a denser image, consisting, as many authorities affirm, of a mercury-silver amalgam, replacing the original one.

This reblackening may be accomplished in a variety of ways, some of which it is not our purpose to touch upon, but certain of them we enumerate below.

As a substitute for sodium sulphite, the use of acetone sulphite has been suggested; and, judging by the results of Dr. Hauberrisser, it certainly has advantages over the older reagent. We have found a 5 per cent. solution to be most useful in practice. Immersed in this the bleached negative soon becomes a brownish black, and it is a noticeable feature of its action that it intensifies the different gradations in their proper relations. Thus a strip of negative consisting of several portions, each one

Portrait of Mlle. B.

twice as dense as the preceding one, will on treatment with acetone sulphite become intensified, but each portion will still bear the same *relation* to those adjacent to it. Some blackening agents produce greater intensification in the high-lights than in the shadows, and so on; and this may lead to an undesirable result.

The bleached negative may be well washed and dried and used without being reblackened at all. A soft print possessing considerable detail may be obtained in this manner, but the negative is liable to fade unless artificial light be used. Such a negative is most suitable for P.O.P printing.

Silver Cyanide. To reblacken with this compound the two following solutions should be prepared :—

A. Silver nitrate ..... 2 parts.
Distilled water ..... 50 parts.

B. Potassium cyanide..... 2 parts.
Distilled water..... ..... 50 parts.

Add A to B, with good shaking, until the precipitate formed is *all but* dissolved.

This gives very fair intensification, but it is often difficult to remove a certain milkiness which remains in the film ; a short treatment with 5 per cent. ammonia solution will render the film quite clear.

To obtain a very strong intensification Pizzighelli recommends the use of potassium iodide after bleaching with mercury as above, and a 10 per cent. solution is what he suggests for the "blackening" bath. The image becomes brownish in colour in this solution, and it must be washed and further treated with a 10 per cent. ammonia solution.

If hyposulphite be employed to redevelop the image, a brown image again results, in which it will be noticed that the high-lights have received the most intensification; hypo is not to be recommended, therefore. unless a harsher effect is desired. A supplementary ammonia bath is again advisable to clear the film.

Re-intensifying. A method of *re-intensifying* a plate insufficiently intensified by mercuric means, due to Dr. Stolze, is worthy of mention. The plate is treated with

Ferric chloride	3 parts,
Water	100 parts,

until a silver chloride image is formed. The plate is next well washed, and then developed (in daylight) with an eikonogen developer diluted to about ten times its normal strength. It is afterwards immersed in a bath consisting of

Sodium sulphite	1 part,
Acetic acid	1 part,
Water	100 parts,

and lastly well washed. This process is stated to be more efficient than re-intensifying with mercury and a suitable blackening bath.

Mercury. Mercuric iodide. If reblackening is to be effected by means of an alkaline developer, eikonogen for example, a solution such as that suggested by Lumière will be found to answer:

Mercuric iodide	1 part.
Water	100 parts.
Sodium sulphite (anhydrous)	10 parts.

The mercuric iodide is added to the bracketed solution, and the intensifier is then ready for use. A thorough washing should be given before redevelopment.

A mercuric iodide bath which requires no redevelopment, by merely a short final treatment with a weak hypo solution, may be made thus:

A.	Mercuric chloride	2 gms. or 30 grs.
	Water	100 cc. or 3½ ozs.
B.	Potassium iodide	6 gms. or 90 grs.
	Water	45 cc. or 1½ ozs.

Add B to A with constant shaking, until the precipitate formed is dissolved. This must be diluted three or four times with water before use. When sufficiently dense, wash the negative and treat with hypo as above directed.

Copper Bromide. This intensifier is a good deal employed in process work, but is also applicable to ordinary negatives. The plate is first bleached in a solution of copper bromide, which is prepared by causing double decomposition between two solutions of potassium bromide and a soluble copper salt, such as the sulphate. For this purpose two solutions may be prepared as below, and mixed in equal proportions :—

A.	Potassium bromide	1 part.
	Water	20 parts.
B.	Silver nitrate	1 part.
	Water	20 parts.

The well-washed negative is bleached in this solution, then again washed, and finally treated with a 5 per cent. solution of silver nitrate. The result so obtained is not permanent, and therefore the process is not one that can be recommended if the negative is required to be lasting.

Uranium. The uranium intensifier we shall mention but briefly; it must be touched upon, however, as it is a type of intensifier entirely different from that of mercury. When mercury is used, we get an image consisting of some sort of silver-mercury amalgam, *i.e.*, in the majority of cases. But when uranium is used the action is to deposit upon the silver image the insoluble ferrocyanide of the new metal. The permanency of the intensified plate depends therefore upon the power of the metallic ferrocyanide to withstand atmospheric influences.

The following will be found an excellent uranium bath :—

Uranium nitrate	20 parts.
Potassium ferricyanide	17 parts.
Glacial acetic acid	2 parts.
Water	1500 parts.

It is essential when using uranium ferricyanide to have the film quite free from thiosulphate, and a "hypo eliminator" is always a desirable safeguard to use. The image is turned reddish-brown, as are generally the whites also; the whites will always become red-stained if any hypo be left in the film; these latter may be cleared by treating the plate with a 5 per cent. solution of ammonium sulphocyanide, and then well rinsing it.

Molybdenum, dissolved in a mixture of nitric and hydrochloric acids, gives a chloride which, in conjunction with potassium ferricyanide, tones the image brown at first, and finally bleaches it. It may then be redeveloped with a 1 per cent. solution of edinol containing a little ammonium carbonate and ammonia. This method, though in its present somewhat vague state of little practical value, is of theoretical interest in so far as it leads up to the new methods of converting the silver image into silver chloride, and then redeveloping, on the one hand, or darkening in sunlight on the other.

A silver bromide plate, when exposed and developed gives a metallic image which by treatment with certain chlorides can be converted into silver chloride. Thus ferric chloride, copper chloride, molybdenum chloride and many others will bleach the image, which may be redeveloped with different reagents. The foregoing example of using ferric chloride and subsequently eikonogen, the method of mercuric chloride and ferrous oxalate are types of this treatment, and although any developer may be employed, these two appear to be most satisfactory.

If a plate which has been bleached by conversion into chloride be placed in sunlight, the silver chloride will be gradually decomposed, and a new image consisting of red or purple photo-chloride produced. This method, a lengthy one indeed, has been advocated on the Continent, not only for intensification, but for toning as well. It is chiefly, however, of theoretical or experimental interest, and cannot be advised for serious work.

Reducing Agents. The principle of reducing the density of a negative or print is as follows: The metallic image is treated with a reagent which will convert it into some compound soluble in an auxiliary reagent. Thus if we use hypo and potassium ferricyanide, the silver will be converted into silver ferrocyanide, a substance soluble in the (auxiliary) hypo:—

$$4Ag + 4K_3FeCy_6 = 3K_4FeCy_6 + Ag_4FeCy_6$$

The formula known as Farmer's is thus:—

Saturated solution of potassium ferricyanide ..... 1 part,
Five per cent. hypo solution..... 10 parts.

Remove the plate before it has been reduced as much as is desired, and give it a thorough washing.

Ammonium Persulphate $(NH_4)_2 S_2 O_8$. This is a good reducer for negatives that possess too much contrast. Silver persulphate is formed during treatment, which is converted by gelatine into a soluble product. A four per cent. solution is recommended, in which the plate is left until sufficiently reduced.

Ammonium persulphate is especially useful in the case of plates over-intensified with mercury and sulphite; it converts the metallic mercury into the sulphate, $HgSO_4$, which is soluble in water.

Gelatine is affected by persulphates, and too long treatment is therefore inadvisable.

Iodide and **Hyposulphite.**—The following formula will be found satisfactory:—

Potassium iodide	1 gm.	or 15 grs.
Hypo	25 gms.	or 375 grs.
Water.....	100 cc.	or 3½ ozs.

This bath acts slowly, but it will be found to reduce all portions, *i.e.*, density and half-tone, evenly.

Hardening the film before intensification.—Where gelatine softening agents, such as ammonium sulphocyanide, are used in reducing or intensifying, it is quite desirable to harden the gelatine by some such agent as chrome alum, formalin, etc.

A 2 per cent. (say, 10 grains per ounce) solution of chrome alum applied to the plate for five or ten minutes will prevent such gelatine solvents having any harmful effects. Of course the chrome alum bath must be followed by washing in several changes of water.

Varnishing Negatives.

By VICTOR WILSON.

OFTEN, when printing, spots will appear on the film which are metallic stains and are due to damp.

This will not occur with varnished negatives. When a negative gets cracked, the film generally gets broken. while, on the contrary, with a varnished film it can be floated off and put on a fresh piece of glass. Films likewise can easily be varnished.

Film. Films have only to be dipped in any one of the following varnish solutions:—

No. 1.—Gum dammar, 50 grs.; benzole, 1 oz. This should be filtered and kept in a stoppered bottle.

No. 2.—Mastic gum, 50 grs.; ether, 4 ozs.

Take the film and carefully dust it with a piece of plush or a tuft of cotton wool. Apply the varnish with a flat camel's hair brush, or immerse the film in the varnish and drain it back into the bottle as shown in Fig. 31. Pin up by one corner to the edge of a shelf to dry. This will take half-an-hour.

Fig. 31.

Glass Negatives. Hot Method. The operation connected with varnishing glass negatives is rather more toilsome, requiring a little patience and care. My method and the hot varnish I use are as follows:—

Varnish Solution.—Bleached shellac, 1¼ oz.; mastic, ¼-oz.; turps, ¼-oz.; sandarac, 1½ oz.; alcohol, 20 ozs.

Procure the following articles:—A fairly wide-mouth, glass-stoppered bottle, some filter papers, and a glass funnel five inches wide. First wash your negative to free it from dust and dirt. When quite dry, place it in front of a fire in a negative

rack until it is just so hot that you can bear it on the back of your hand. Now hold it with a plate-holder, and pour on to the centre of the film of negative a large pool of varnish. Let it spread out until it has made as large a pool as it can. Then gently tilt the plate so that the varnish can run from one side to the other, taking care not to let it run over the sides. Leave one corner bare. When all else is covered, place it in the funnel, as shown in Fig. 32), with a filter paper inside the glass funnel. When it has quite finished draining, pour back the varnish into the stock bottle, remove the plate and place it on a stove to dry, or else on blotting paper over the mantelpiece.

Fig. 32.

Cold Method. This method is exactly the same, except the warming and drying. Dry only on the blotting paper. For the cold method use the following solution :—Sandarac, ½-oz.; chloroform, 3 ozs.

To Remove Varnish. If it is required to remove the varnish from the negative, first soak the negative for ten minutes in methylated spirits, and then rub the surface gently with a tuft of cotton wool dipped in the spirits.

The following are varnishes I have used with more or less success :—

With Heated Negatives.—Celluloid, 10 grs. ; amyl acetate, 2 ozs.

Another : Orange shellac, 2½ ozs. ; turpentine, ¼ oz. ; alcohol or meth. sp., 1 pint.

Another : Dammar, 3 ozs.; benzole, 3 dr.; alcohol, 10 ozs. ; oil lavender, 2 dr.

Cold Varnishes.—Sandarac, 1 oz. ; chloroform, 6 ozs.

Another : White hard varnish, *plus* just enough strong ammonia added to yield a clear solution.

Supplementary Notes on Fixing, Washing, Drying, Intensifying, Reducing, Developing, Hardening, Clearing, Stains, Fogs, etc.

By THE EDITOR.

HYPO has been called the photographer's best friend and worst enemy. When he wants it, he wants it badly, and when he wants to be rid of it, he has to take considerable care to secure this end.

Fixing Negatives.—When the negative leaves the developing dish it consists of a (negative) image of (developed) metallic silver surrounded by (undeveloped) bromide of silver. Fixing consists in removing this silver bromide by means of a solution which will dissolve the bromide and not affect the metallic image. For this purpose we employ an aqueous solution of "hypo" (hyposulphite or thiosulphate of soda).

The Strength of the Fixing Bath is a matter of first importance. When bromide of silver is put into a solution of hypo a double salt of silver and soda is formed (silver-soda hyposulphite) which is only very sparingly soluble in water, but freely soluble in a solution of hypo. We therefore must have present enough hypo (1) to form this double salt, and (2) to dissolve it again. This double salt is at first a light colour, but quickly turns brown and black. The fixing bath may be made too weak in the first instance or may be quite strong enough to start with, but become weak by repeated use. In either case it must fail to serve its purpose. Again, if the fixing bath is very cold its action is greatly retarded and imperfect fixing likely to result.

The Bath may be too Strong.—This does not act so quickly as one of proper strength. Moreover, when a plate is removed from a very strong bath and put to wash in plain water there is an increased risk of frilling.

Fig. 8. W. Weaver Baker.

Strong Light tends to convert the double (silver-soda) salt into an insoluble compound. Therefore the fixing bath should not be in a position exposed to strong light.

Proportions.—Fortunately we need not observe very great accuracy, provided we keep within certain easily and remembered limits.

The fixing bath should not vary beyond

One pound of hypo in one quart of water.
,, ,, two quarts ,,

A Convenient Dodge.—Well wash an old pyro "ounce" bottle. This will be found to hold about 20 oz. of water, or 16 oz. of rough hypo crystals. If then we fill up our bottle *once* with hypo crystals, and then thrice fill it with water we get a desirable proportion of hypo and water.

Use Tepid Water when making up the fixing bath if it is to be used at once. Because dissolving hypo in water very considerably lowers the temperature of the solution. If ordinary cold tap water be used the bath should stand in a warm room until it acquires a temperature of about 60°F.

How am I to know when a Plate is Fixed? is a question often asked by the beginner. As one cannot be sure as to the exact moment, seeing that the operation is not visible, the best plan is to keep well on the safe side and give ample time. Fixing is really a two-fold process, *i.e.*, dissolving the silver bromide and forming the double salt of soda and silver. This goes on somewhat slowly as one may see by noting the gradual disappearance of the creamy appearance of the film. The second is dissolving this salt in excess of hypo; this goes on fairly quickly. It is a good old safe rule to allow as much time in the fixing bath after the milkiness has gone as it took to dissolve out the milkiness.

Hypo Tests.—For high-class work it may be necessary to test the drip-water from a washed plate for the presence of hypo.

Place the plate in a quite clean dish and cover with distilled water, rock gently every half-minute or so for not less than five, and preferably ten

minutes, then collect the drip water from the plate in a test tube. Divide this into six portions and test thus:—

(1) Add silver-nitrate solution 5 per cent. a few drops, and then slowly heat the tube and contents. If hypo is present to the extent of 1 in 100,000 the solution will change yellow or brown.

(2) Add a few drops of saturated solution of mercuric chloride. A milky appearance indicates the presence of hypo.

(3) Dissolve a pinch of white starch in a tablespoonful of boiling water. Add a few drops of a 10 per cent. solution of potassium iodide to which has been added a flake or two of pure iodine, forming a sherry-coloured solution. This yields a fine blue colour. Dilute this until you have a *pale* sky-blue tint. Then add the third lot of water to be tested. If hypo be present the blue colour is lightened if not discharged.

(4) In an ounce of water dissolve 2 grains of potassium permanganate and 20 grains of caustic potash. Take one drop of this solution and dilute it with water until a *pale* rose tint is seen when a teaspoonful or so is in the bottom of a white teacup. Now add No. 4 of the water to be tested. If the pink colour is discharged or turned greenish, hypo is present.

(5) Into the fifth lot of test water throw two or three bits of granulated zinc. Then add a drop or two of hydrochloric acid. Moisten a bit of white filter paper with a solution of lead acetate and lay this over the mouth of the test tube. If this test paper is darkened by the gases evolved from the solution, we may conclude hypo is present.

(6) Take equal parts of a 5 grain-per-oz.-solution of potass. ferricyanide and a 30 grain-per-oz.-solution of ferric chloride and mix. Carefully note the colour by looking through the solution at a piece of white paper. Now add portion of No. 6 of the drip water—greenish tinge indicates the presence of hypo.

In all cases it is assumed that distilled water is used in making these tests, otherwise the impurities present in the tap water may upset the above reactions.

Drying Negatives Quickly.—After the negative has been well washed, shake off as much water as possible and surface dry the film by gently dabbing with a handful of clean dry rag rolled up into a ball. Then place the negative in a dish of alcohol and let it there remain for at least five (and better ten) minutes. Remove and set up in a draining rack in a place where there is a good current of air, *e.g.*, facing an open window or in a passage. In place of alcohol we may use good quality methylated spirit, but this is apt to produce markings. In this case matters may be improved by the addition of some methylated sulphuric ether. To 10 oz. of methylated spirit add 1½ oz. of methylated sulphuric ether and 1 oz. of *anhydrous* potassium carbonate. This potassium salt absorbs the water abstracted by the alcohol, so that this must be occasionally removed by filtering and well dried in a warm oven and again returned to the stock bottle to repeat its usefulness.

Hardening Baths.—These are used to harden on tan the gelatine with a view to preventing its solution, frilling at the edges of the plate or the formation of blisters. Negatives so hardened are less liable to be affected by damp atmosphere or the ravages of the omnipresent microbe. Some authorities say that if a plate be hardened before developing it reduces the probabilities of developer stains. Hardened plates take longer time to fix, wash, etc.

(1) Commercial formalin (40 per cent. solution of formic aldehyde), 1 part; water, 15 to 20 parts. Time, 7 or 10 minutes' immersion.

(2) Cold saturated solution of common (potash) alum. Time, 10 minutes.

(3) Chrome alum, 1 part; water, 20 parts. Time, 10 minutes.

(Chrome alum is a more powerful hardening agent than common alum).

In all cases, it is desirable, though not always essential, to wash the plate well after any of these hardening baths.

Hardening and Clearing Baths.—These are designed to help in the removal of developer stains.

(1) Cold saturated solution of alum, 20 ozs. ; hydrochloric acid, 1 drm.
(2) Water, 20 ozs. ; alum, 1 oz. ; citric acid, ½-oz.
(3) Water, 20 ozs. ; alum, 1 oz. ; soda sulphite, 2 ozs. ; sulphuric or hydrochloric acid, 30 min. ; or citric acid, ½-oz.
(4) Water, 20 ozs. ; alum, 1 oz. ; iron proto-sulphate, 2 ozs. ; sulphuric acid, 60 min.

For this bath it is claimed that it gives the best printing colour for a negative.

(5) Water, 20 ozs. ; citric acid, 75 grs. ; thio-carbamide, 160 grs.
(6) Water, 20 ozs. ; acetic acid, 70 mins. ; alum, 150 grs. ; thio-carbamide, 160 grs.

Combined Bath for Hardening, Clearing and Fixing.—

A. Water, 6 ozs. ; soda sulphite, 2 ozs. ; sulphuric acid, 1 drm.
B. Water, 40 ozs. ; hypo, 12 ozs.
C. Water, 6 ozs. ; chrome alum, ½-oz.

Add B to A, mix well, and then add C.

Acid Fixing Baths have aroused much controversy. Many experienced workers are on the *pro* side, and assert that the *cons* only point to the improper preparation of this bath. This is a matter of first importance, as the following points will show.

(1) If to an aqueous solution of hypo a little sulphuric or hydrochloric acid be added, an odour of sulphurous anhydride (sulphur dioxide), is evolved. The liquid becomes opalescent, turbid, milky, and deposits sulphur. Hydrogen sulphide is also evolved. Hence silver in the presence of sulphur or sulphuretted hydrogen is liable to be changed to silver sulphide.
(2) If to hypo solution we add soda sulphite, and then add acid, the same thing happens as before.
(3) But if acid sulphite of soda be added to hypo solution we do not get decomposition of the hypo as just described.
(4) The presence of an acid sulphite is desirable on account of its assistance in preventing stains.

Fig. 9.

E. F. Oakshott.

PRACTICE.

PRINT CRITICISM PRIZE.

The proper procedure is not to add acid to hypo and sulphite solution, but to prepare two separate solutions as follows—

A.	Hypo	250 grammes ...	8 ozs.
	Water	1000 cc.	35 ozs.
B.	Neutral soda sulphite	45 grammes ...	1½ drms.
	Sulphuric acid.....	4 cc.....	67 mins.
	Water.....	150 cc.....	5¼ ozs.

The solution B should be well stirred and allowed to stand for an hour or so, then the two solutions A and B comingled to form the bath. The above proportion of sulphuric acid must not be exceeded, or decomposition of some of the hypo will result when A and B are mixed.

The Alkaline Fixing Bath has several expert opinions to support it. If a negative be passed from an alkaline developer at once into an acid bath, it is highly probable that some gas will be disengaged in the film. This may lead to frilling and blisters. If the plate be subjected to washing after development and before fixing, the preservative (sulphite, etc.) is removed, and the danger of discoloration increased. A very dilute solution of pyro is capable of yielding a deep stain. The acid bath, while it lightens the colour of the staining matter, at the same time precipitates it and renders it insoluble in water. The following alkaline bath is supported by a reliable expert: —

Water, 20 ozs.; hypo, 4 ozs.; soda sulphite, ¼-oz.; soda carbonate, 30 grs.

This keeps well and may be used over and over again until it becomes too slow to be serviceable.

Alum added to the Fixing Bath is undesirable because (1) it tends to harden the gelatine, and so retards fixing and subsequent elimination of the hypo; (2) it also tends to and usually decomposes some of the hypo forming various bodies which are certainly useless and probably harmful.

Hypo Elimination.

(1) Water, 5 ozs.; hydrogen peroxide, 1 drm.

Immerse for 4 or 5 minutes and wash well.

(2) Potassium percarbonate, 2 grs. per oz. of first washing water.

Plate-washing Apparatus.—Various forms are on the market. When selecting the points to remember are:—(1) *Steady* and constant flow of changing water. (2) Plates must not be too near each other. (3) Should the water supply cease, the plates must remain quite covered with water, or markings will result. (4) If the same apparatus will at the same time hold different sizes of plates it may be found a great convenience.

To test the efficiency of any plate or paper-washing apparatus all we need do is to mix a teaspoonful of ink with the water, and put a bit of opal glass in place of a negative and note the rate at which the ink discoloration of the water is removed by the flow.

Caution.—It must not be concluded from such a trial that a plate will be hypo free as soon as this wash water is ink free. All this experiment shows is the speed at which the water is being changed.

Limits of Strength of the Fixing Baths.—According to Dr. Weintraub the limits of the fixing bath should not go beyond 15 to 25 per cent. hypo, *i.e.*, between 3 and 5 ozs. hypo per pint solution.

(1) If the strength be below 15 per cent. there is a probability of the formation of insoluble double hyposulphite of silver and soda ($Ag\ Na\ S_2O_3$).
(2) Between the above limits the soluble double salt $Ag_2\ Na\ (S_2\ O_3)_3$ is formed.
(3) In solutions stronger than 25 per cent. it is probable that silver hyposulphite $Ag_2\ S_2\ O_3$ will be formed, and that this will quickly break up into sulphuric acid and silver sulphide. The sulphuric acid in turn will decompose the hypo in the bath with liberation of sulphur.

Fixing Baths.—

(1) Water, 16 ozs.; hypo, 4 ozs.; potassium metabisulphite, ½-oz.
(2) No. (1) plus the addition of chrome alum, ½-oz.
(3) Water, 20 ozs.; hypo, 6 oz.; soda sulphite, 2½ oz.; tartaric acid, 2 ozs.

Add the hypo when all the other constituents are thoroughly dissolved.

(4) Water, 20 ozs.; hypo, 4 ozs.; soda sulphite, 1 oz.; soda carbonate, 1 drm.
(5) Water, 20 ozs.; hypo, 4 oz.; acetone sulphite, ½-oz.

Mercuric Chloride known also as mercury bi- or per-chloride, *corrosive sublimate*, etc., is a dangerous poison. In case of poisoning at once induce vomiting by tickling the back of the throat with a feather, and administer a raw egg beaten up with a cupful of water. Care must be taken not to confuse mercur*ic* chloride with mercur*ous* chloride, *i.e.*, mercury sub- or protochloride, *i.e.*, *calomel*, a substance used as a medicine.

Mercuric Chloride Bath.—This may conveniently be of strength 20 grs. mercuric chloride per 1 oz. water. An equal weight (*i.e.*, 20 grs. per oz.) of ammonium chloride *or* 3 mins. hydrochloric acid may be added, for they tend to prevent staining and also keep the mercury in solution. (N.B.—Excess of acid may induce frilling). For this reason it is advisable to use slightly acid water for the first two or three washings after bleaching—say ½-drm. hydrochloric acid per pint of water.

Mercurial Intensification, for reducing or increasing contrasts. The student must not confound increase of contrast with increase of density. For we may reduce contrasts by adding relatively more density to one part than another.

If a moderate contrast negative be placed in a strong mercuric chloride bleaching bath and removed at an early stage it will be found, on looking at the back or glass side, that the thin shadow details are bleached through while the dense high-lights yet are black, as seen from this side. If the plate be now darkened contrasts will be reduced. But if bleaching be allowed to act until all parts of the negative are bleached right through to the glass side of the negative and then darkened, we shall get not only additional density but additional contrast as well.

Mercury Sulphite Intensification.—When a plate bleached in mercuric chloride solution is (after due washing, of course) darkened by a soda sulphite solution it seems that half the weight of silver is removed and replaced by rather less weight of mercury. By some molecular rearrangement there is a slight gain in opacity or printing contrasts. But if the process of bleaching and darkening be repeated a second time, a further

replacement of silver by mercury, as before, takes place and a reduction rather than intensification results. It is sometimes stated that hypo will dissolve the intensification product of this process, but this can only occur either when the blacking by the sulphite has been incomplete or the plate has been insufficiently washed before darkening.

Mercury and Silver Cyanide Intensification (Monckhoven's process).—Prepare separate solutions (A) silver nitrate, 100 grs; water, 5 ozs. (B) Potassium cyanide, 100 grs.; water, 2 ozs. Add B to A a few drops at a time, shaking between each addition, until the white curdy precipitate first formed is nearly, but *not all* redissolved. The negative is first bleached by mercuric chloride (p. 35), well washed and then darkened by the above silver cyanide solution. If it is too dense it may be reduced by hypo, 4 ozs.; water, 20 ozs. Prolonged immersion in this hypo bath restores the negative to its original condition.

Local reduction may be affected by brush application of hypo solution.

Modification of above (Abney).—(A) Mercuric chloride, 100 grs.; water, 10 ozs. (B) Silver nitrate, 100 grs.; water, 10 ozs. Potass. cyanide—enough to nearly dissolve all the precipitate first formed. The plate is bleached in A, washed and darkened in B.

It is stated on excellent authority that if the plate be thoroughly freed from hypo and the silver cyanide solution be boiled until there is no further evolution of ammonia and no more black precipitate formed, and the solution then filtered and used cold, that no stains will arise and that the results are permanent.

Ferrous Oxalate Developer.—Should the worker be so situated that he is not able to obtain water free from lime he should fill a large bottle with water and add a few grains of potassium oxalate finely powdered. When this is dissolved it will precipitate the lime from the water. If the bottle is allowed to stand for a few hours this precipitate will fall to the bottom when the clear (lime-free) part can be decanted and used for the first two or three washings (p. 15).

Fig. 10. W. B. Topping.

MOUNTING COMPETITION.
EXTRA BRONZE MEDAL.

Ferrous salts in dilute solution and the presence of air are liable to form insoluble basic ferric salts. This tendency is greatly reduced if an acid be present. Therefore, when using ferrous oxalate as a darkening solution after mercurial intensification it is advisable to acidify the first one or two wash waters—a 3 per cent solution of sulphuric or oxalic acid is suitable.

Mercury and Hyposulphites.—If hyposulphites of the heavy metals be used to darken the mercury-bleached image satisfactory intensification results, *e.g.*:—

(1) Water, 1 oz.; gold chloride, $\frac{1}{2}$-gr.; hypo, 4 grs. The image then consists of gold, silver and mercury. (This is virtually the old sel d'or, at one time generally used).
(2) To a solution of lead acetate or nitrate add a solution of hypo until the precipitate first formed is redissolved.
(3) Silver bromide dissolved in a 10 per cent solution of hypo.

Soda Sulphite Solution may conveniently be 5 per cent strength. It is not absolutely essential in this case that the film be quite free of mercuric chloride.

Repeating Mercurial Intensification.—Mercuric chloride followed by soda sulphite cannot be repeated a second time with any strengthening advantage—nor can ammonia be used a second time for any gain. But each repetition with ferrous oxalate means a specific gain on the ferrous addition. This also applies to the use of potassic argentic cyanide (Monckhoven's process).

Recovery of Faded Negatives (Crook's process).—Soak the plate thoroughly. Develop with pyro-soda in the dark for 15 minutes—wash. Refix in 15 per cent. hypo. Pass into sulphate of iron and alum clearing bath. Wash. Tone in gold chloride, 1 gr.; ammon. sulpho-cyanide, 7 grs.; water, 1 oz.

Mercury Stains.—Brown, local or general discoloration, due to imperfect washing after bleaching, sometimes may be removed by a bath of 10 drops hydrochloric acid, per oz. water. It has been stated that if the whole plate be intensified with uranium and then this removed by dilute ammonia that the spots are removed also.

Ammonia.—The strength of this should not exceed 20 drops strong ammonia per oz. water, as ammonia is a solvent of silver chloride. If this strength be exceeded intensification effect is reduced, irregular action, spots and pinholes are likely to arise. The film must be quite free of mercuric chloride.

Darkening Baths after Mercuric Chloride Bleaching:—

(1) Ferrous oxalate developer (p. 15).
(2) Ammonia.
(3) Soda sulphite.
(4) Ammonium sulphide, 1 part; water, 10 parts.
(5) Lime water.
(6) Potassium *or* sodium hydrate, caustic potash, soda, 1 to 2 per cent solutions.
(7) Silver cyanide process.
(8) Acetone sulphite.
(9) Schlippe's salt, 10 grs.; water, 1 oz.; ammonia, 3 mins. This gives a very considerable gain of printing value.
(10) Mercuric iodide and hypo (Edwards' process).
(11) Eder's process. Water, 4 ozs.; mercuric chloride, 4 grs.; potass. iodide, 4 grs.; potass. cyanide, 8 grs. This also gives a very considerable intensification—perhaps the maximum effect obtainable by any non-repeated procedure with mercuric chloride.
(12) Hyposulphites of the heavy metals (p. 37).
(13) Ordinary alkaline developers, *e.g.*, pyro, metol, etc.
(14) Potassium gallate. Water, 30 ozs.; gallic acid, 1 gr.; potassium hydrate (caustic potash) 15 grs.
(15) Water, 2 ozs.; caustic soda, 5 grs.; formalin, 20 mins.

Faded Negatives.—Should a mercury intensified negative fade it may be "restored" by immersion in water, 1 oz.; Schlippe's salt, 15 grs.

Mercury-Ammonia Iodine (Eder's Process).—Bleach the plate in mercuric chloride, ¼-oz.; water, 20 ozs. Wash. Blacken in water, 20 ozs.; ammonia, 1 oz. Wash. Further intensify in water, 20 ozs.; potass. iodide, 1 oz.

Failures with Mercuric Chloride Intensification.—

(1) If the bleaching solution be too strong (*i.e.*, beyond 30 grs. of the salt per oz. water) the film may be reticulated or spotty.

(2) Iridescent or metallic markings due to imperfect washing after bleaching, or using ammonia too strong. These stains can be removed by rubbing with wash-leather, moistened with alcohol or methylated spirits.

(3) Streaky marking, grey scum, etc., due to lime in the washing water. The plate during and after washing, after bleaching should be rubbed with a pad of cotton wool.

(4) Yellow or brown stains, spots or patches due to imperfect removal of hypo before bleaching, hypo-contaminated finger or hypo splashings.

(5) Stains and streaky marks will result if strong ammonia be added to the dish containing the plate while it is being darkened. It is important that the ammonia be well mixed with the water before being applied for this purpose.

Mercuric Iodide Intensifier (Lumière).—(1) Mercuric iodide, 1 part; soda sulphite crystals, 20 parts; water, 100 parts. In this case intensification may be proceeded with as soon as fixation is complete and the plate has been washed for a few minutes. Intensification may be stopped at any stage and the plate well washed. Prolonged washing induces a greenish-yellow tinge. After intensification it is desirable to bath the negative in a separate 10 per cent. solution of soda sulphite, or the plate may be immersed in any of the ordinary alkaline developers.

The image, if too strong, may be reduced in a clean hypo fixing bath, which ultimately brings back the negative to its original state. The above solution may be kept in the dark for a considerable time. For permanent results it is recommended always to use the alkaline developer as above suggested.

The deposit is of a greenish-brown colour. The action is practically uniform in all parts, giving a density increase of roughly 1 to 1¾. If the density is excessive it may be reduced by a weak solution of potassium cyanide.

Alternative method of preparation: Dissolve 10 grs. mercuric chloride in 3 or 4 ozs. water; add a 10 per cent. solution of potassium iodide little by little, until the red precipitate formed is just dissolved. Stir or shake well between each addition; now add ½-oz. soda sulphite crystals, and make up total bulk to 10 ozs.

Mercuric Iodide and Schlippe's Salt.—To a saturated solution of mercuric chloride add a 10 per cent. solution of potassium iodide until the red precipitate first formed is just dissolved. In this solution immerse the plate, which now turns a warm black or brown colour. Wash, and blacken with a 10 grain per oz. solution of Schlippe's salt.

Mercuric Iodide Intensification (Edwards' Process).—

A. Mercuric chloride ..	30 grs. ...	Water,	2 ozs.
B. Potassium iodide ...	90 grs. ...	,,	2 ozs.
C. Hypo	60 grs. ...	,,	2 ozs.

Add A to B and shake well; a bright red precipitate (mercuric iodide) is formed. C is then added, and the solution again becomes clear. The plate is immersed in this solution, and goes on increasing in density up to a moderate degree. It is then rinsed and passed through a clear hypo fixing of normal strength. The above intensifying solution keeps fairly well in the dark. The results are liable to fade, but may be redarkened by an application of Schlippe's salt—10 grs. per oz. water. Obviously this intensifier can be used before all the hypo has been removed, after the fixing bath following development.

Another formula.—Water, 3 ozs.; mercuric chloride, 20 grs. When dissolved add 80 grs. potassium iodide. When dissolved add hypo 64 grs. If results unsatisfactory, a greater part of effects may be removed by hypo fixing bath.

Mercuric bromide and iron.—After bleaching with mercuric bromide and well washing, then darken the plate by ferrous oxalate precisely in the manner described on page 15.

Fig. II.

PRINT CRITICISM PRIZE.

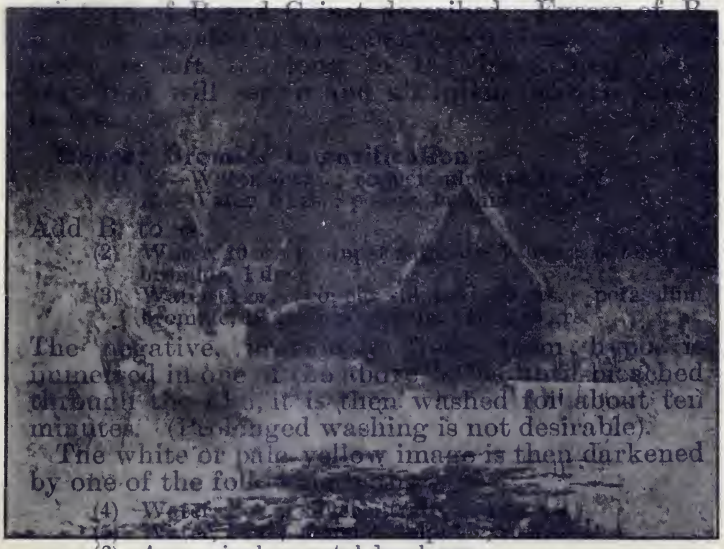
H. B. Cookson.

Mercuric bromide and soda sulphite intensification.—(1) Water, 10 ozs.; mercuric chloride, 100 grs. When dissolved add potassium bromide, 100 grs. Bleach the negative, wash well and darken in. (2) Water, 10 ozs.; soda sulphite, 1 oz. This has a much stronger strengthening effect than mercuric chloride and soda sulphite, the increase of density being roughly one third; but in the thinnest portions there is practically no increase. No useful purpose is gained by repeating the process.

A hypo bath will considerably reduce the intensification effect, but does not quite bring back the negative to its original condition. It may also be reduced by water, 1 oz.; potassium cyanide, 2 grs.; caustic potash, 2 grs.

Mercury bromide and silver cyanide intensifier.—A. Water, 2 ozs.; mercuric chloride, 20 grs.; potassium bromide, 20 grs. B. Potassium cyanide, 20 grs.; water, 1 oz. C. Silver nitrate, 20 grs.; water, 1 oz. Add C to B a little at a time, mixing well after each addition, until the precipitate formed is not quite all dissolved. Bleach the negative in A, wash well and then darken in the

(A. p. 17.)



Add B to C.

(2) Water

(3) Water

The negative, [illegible] bath, is [illegible] bleached through [illegible], it is then washed for about ten minutes. (Prolonged washing is not desirable).

The white or pale yellow image is then darkened by one of the following:—

(4) Water

(6) Any quinol or metol developer.

Fig. 15.

Fig. 12. F. C. L.

NEGATIVE BEFORE INTENSIFICATION.

(A. p. 17.)

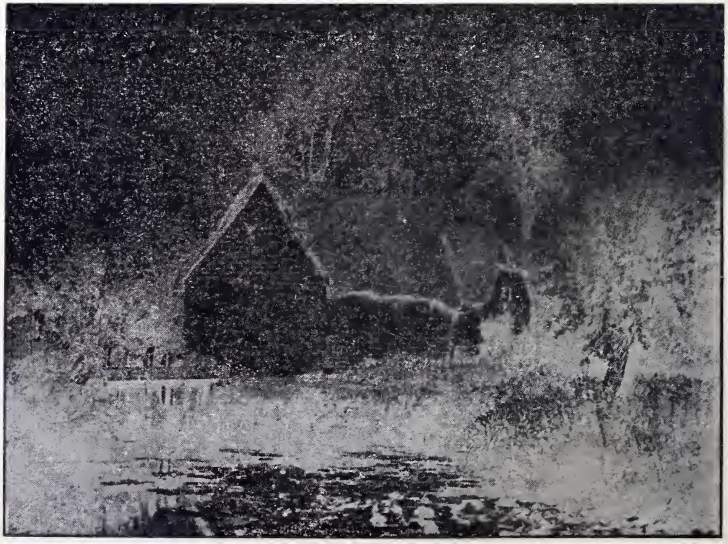


Fig. 13. F. C. L.

NEGATIVE AFTER INTENSIFICATION.

(B. p. 17.)

Mercuric bromide and soda sulphite intensification.—(1) Water, 10 ozs.; mercuric chloride, 100 grs. When dissolved add potassium bromide, 100 grs. Bleach the negative, wash well and darken in. (2) Water, 10 ozs.; soda sulphite, 1 oz. This has a much stronger strengthening effect than mercuric chloride and soda sulphite, the increase of density being roughly one-third; but in the thinnest portions there is practically no increase. No useful purpose is gained by repeating the process.

A hypo bath will considerably reduce the intensification effect, but does not quite bring back the negative to its original condition. It may also be reduced by water, 1 oz.; potassium cyanide, 2 grs.; caustic potash, 2 grs.

Mercury bromide and silver cyanide intensifier.—A. Water, 2 ozs.; mercuric chloride, 20 grs.; potassium bromide, 20 grs. B. Potassium cyanide, 30 grs.; water, 1 oz. C. Silver nitrate, 20 grs.; water, 1 oz. Add C to B a little at a time, mixing well after each addition until the precipitate formed is not quite all dissolved. Bleach the negative in A, wash well and then darken in the mixture of B and C just described. Excess of B must be avoided or irregularity will ensue. If the plate be left too long in the blackening bath reduction will set in and all intensification effect be lost.

Copper Bromide Intensification :—

(1) A.—Water, 5 ozs.; copper sulphate, 50 grs.
B.—Water, 5 ozs.; potass. bromide, 45 grs.

Add B. to A.

(2) Water, 10 ozs.; copper sulphate, 1 drm.; potassium bromide, 1 drm.

(3) Water, 1 oz.; copper sulphate, 25 grs.; potassium bromide, 10 grs.; potassium iodide, 5 grs.

The negative, previously freed from hypo, is immersed in one of the above baths until bleached through the film, it is then washed for about ten minutes. (Prolonged washing is not desirable).

The white or pale yellow image is then darkened by one of the following baths :—

(4) Water, 1 oz.; silver nitrate, 10 grs.
(5) Water, 1 oz.; ammon. sulphide, 20 mins.
(6) Any quinol or metol developer.

For extra density the plate is first darkened in (4), washed for a few minutes and then treated in bath (6).

(7) Water, 1 oz.; ammonia, 1 drm.

Cupric Bromo-iodide Intensification (Jenner's process):—

(1) Water, 6 ozs.; copper sulphate, 200 grs.; when dissolved add potass. iodide, 16 grs.; potass. bromide, 40 grs.; previously dissolved in water, 2 ozs.

Mix well, allow any precipitate to settle, and decant the clear part for use. Immerse the plate (which must be quite free from hypo) in the above solution in daylight. The film becomes yellow, then wash and darken in a solution of soda sulphite, 20 %, to which 1 gr. of silver nitrate per oz. has been added.

Or darken in a quinol developer such as:—Quinol, 10 grs; soda sulphite, 60 grs.; soda carbonate, 15 grs. potass. bromide, 1 gr.; water, 1 oz.

Lead Intensification.—

(1) Water, 10 ozs.; glacial acetic acid, ½-oz.; lead nitrate, ½-oz.; potassium ferricyanide, ¾-oz.
(2) Water, 4 ozs.; lead nitrate, 80 grs; potassium ferricyanide, 120 grs. Add nitric acid 10 per cent. drop by drop, until the cloudy appearance of the solution vanishes. This will probably require the addition of about 40 or perhaps 50 drops of dilute acid.

The negative is bleached and then well washed in water just acid with dilute nitric acid (say, 20 drops strong acid per pint of water) and darkened in

(3) Ammonium sulphide. strong solution, 20 min.; water, 1 oz.;
(4) Schlippe's salt, 20 grains; water, 4 oz.
(5) Schlippe's salt, 10 gr.; ammonia, 10 min.; water, 2 ozs.
(6) Water, 4 ozs.; potassium bichromate, 120 grs.; Ammonia, 100 min.
(7) Ordinary quinol developer.

The darkened negative again requires washing The lead bleaching baths should be kept in the dark. The lead method is particularly well suited for line subject negatives (engravings, etc.), where vigorous contrasts are required.

It should be noted that the "bleaching" baths convert the image into a pale yellow, not white colour. For bright results the washing after bleaching should be thorough or the parts that should be clear will be fogged.

The chromate after-bath (6) gives an orange negative of great printing value.

This process may be repeated, with proper washing of course between each bath.

Uranium-Ferricyanide Intensification.—

Water, 10 ozs.; glacial acetic acid, ½-oz.; uranium nitrate (or acetate) 100 grs.; potassium ferricyanide, 100 grs.

This does not keep beyond quite a short time. A two-solution formula is more convenient.

A. Water, 4 ozs.; glacial acetic acid, 60 min.; uranium nitrate, 40 grs.

B. Water, 4 ozs.; glacial acetic acid, 30 min.; potassium ferricyanide, 50 grs.

Mix equal portions of A and B. The plate turns warm black, brown, chocolate and on to sienna red. The non-actinic colour of the deposit should be kept in mind or intensification may easily be overdone if density only be regarded. Fortunately the intensification deposit is very easily removed by washing in water *slightly* alkaline with, say, a few drops of ammonia or a pinch of soda carbonate. Tap water is frequently slightly alkaline and prolonged washing under the tap will often remove the intensification. The intensified negative should therefore be washed in water containing a few drops of acetic acid per oz., say a dram of acid to a pint of water. If the high-lights are not cleared by the acid water then the plate may be washed in water, 10 ozs.; amm. sulphocyanide, 30 grs. Streaks and marks sometimes arise from allowing the spray or tap to play on the surface of the film, locally removing intensification effects. Uranium-intensified negatives are liable to fade, but may be reintensified at any time. The process is useful for local application, *q.v.* It is important in this process that the plate be well washed to free it from hypo before intensification begins. Otherwise reduction and staining will result. *Vide* uranium as a reducing process.

Uranium Intensifier (two-solution process).—The negative is first immersed in a 3 per cent. solution of potassium ferricyanide to which 3 per cent. of acetic acid has also been added. Here it remains until no further change is visible. It is then well washed and transferred to water, 100 parts; table salt (sodium chloride), 10 parts; uranium nitrate, 2 parts; when the image changes to a red colour. It is then well washed in water containing a few drops of acetic acid per ounce of water. This two-solution method tends to give results more free from general staining than what is usually obtained by the one-solution method. The disadvantage is that we cannot so readily estimate the degree of intensification attained as we can by the one-solution method, for in the latter case the negative may be withdrawn at any desirable moment. But by the two-solution method we can form no opinion as to density change until the plate leaves the second bath.

Silver Sulphocyanide Intensification. (Wellington's Process). — Owing to the presence of a sulphocyanide which tends to soften and frill the gelatine film, it is desirable to first harden the gelatine either by a bath of chrome alum 1 part, water 20 parts, or Formalin (40 per cent. commercial solution) 1 part, water 10 to 15 parts. After hardening, the plate should be well washed, and may or may not be dried as convenience dictates.

In 1 oz. distilled water dissolve 50 grs. silver nitrate. Then add crystals of ammonium sulphocyanide until the curdy white precipitate first formed is just redissolved. (This will require about 120 grs. of the ammonium salt). Now dilute with pure water to total bulk of 10 oz. This will throw out a chalk-like precipitate. Now add 10 per cent. solution of Hypo drop by drop—with constant stirring—until the precipitate is once again just, but only just, redissolved. To save the mistake of excess, it is well to deal with this 10 oz. solution in two equal lots separately, so that an excess of hypo in the first half may be counteracted by additions from the second half; and also this procedure gives one a good idea as to how much hypo is required. This forms our stock solution, and keeps some time if distilled water only be used.

Fig 14

PRINT CRITICISM PRIZE.

C. E. Few.

Fig. 15. F. C. L.

BEFORE INTENSIFICATION.

(AA p. 17).

Fig. 16. F. C. L.

AFTER INTENSIFICATION.

(BB p. 17).

Of this stock solution take 1 oz., add soda sulphite, 12 grs.; ammonium bromide, 2 grs.; pyro, 3 grs.; ammonia, 6 minims. This is applied to the plate like an ordinary developer. The dish is gently rocked and the plate withdrawn at the desired degree of intensification, washed and passed through a clean hypo fixing bath.

Distilled water should be used for making up this intensifier. The dish used must be quite clean, or the silver will be deposited on the dish instead of the negative.

In this case it is not essential that the plate be quite free of hypo. The occasional worker is advised to keep his stock solution in the milky form, and add the hypo for clearing just before mixing with the pyro and other ingredients of the normal developer. This intensifier does not change the colour of the negative, and may be locally applied with a tuft of wool or a brush. If intensification has been carried too far, it may be removed by any silver solvent such as hypo and ferri-cyanide, potass-cyanide, etc.

The process can be repeated again and again, and at any stage may form the basis for the other methods of intensification, *e.g.*, mercury, uranium, lead, etc.

All things considered this is perhaps the most flexible and therefore most useful of intensification methods.

Two points should be noted. First, bromide acts as an accelerator; and second, the negative looks much denser when dry than when wet.

Silver Intensification. (Goedicke's Process).

A. Water, 2 ozs.; ammonia sulpho-cyanide, 1 oz. silver nitrate, 20 grs.; soda sulphite, ½ oz. hypo, 50 grs.; potassium bromide, 6 grs.
B. Of A take 60 mins., add water, 1 oz., and Rodinal, 20 mins.

After intensification fix in the usual bath. Reduction may, of course, be effected by any of the usual silver dissolving methods, such as hypo and ferri-cyanide, potassium-cyanide, etc.

In place of Rodinal, one may use Pyro, Metol, etc., but Rodinal has the advantage of slow and steady action.

In this case the complete removal of the hypo is not essential. The process may be repeated, and will give any amount of intensification according to times and quantities. It may at any stage be followed by mercurial intensification.

Silver Intensification (Balagny's process):—

A. Water, 1 oz.; silver nitrate, 25 grs.
B. Water, 1 oz.; sodium sulphite, 125 grs.

Add A. to B. slowly with shaking until the precipitate formed is redissolved. The plate is then darkened in any ordinary developer.

(This process has not proved very successful in our hands.)

Silver Citrate Intensification.

A. Water, 1 oz.; citric acid, 15 grs.; pyro, 50 grs.
B. Water, 1 oz.; nitric acid, 40 mins.; silver nitrate, 60 mins.

Take 30 mins. of A. and B., dilute to 1 oz. and apply to the plate. This works steadily but somewhat slowly.

Silver Intensification.

A. Water, 3 ozs.; silver nitrate, 120 grs.
B. Water, 1 oz.; potass. bromide, 90 grs.

Mix A. and B. Shake. Decant from the precipitate. Wash the precipitate and dissolve it in water, 4 ozs. hypo, ½-oz. In this immerse the plate and darken by ferrous oxalate.

Silver Intensification (Farmer's process):—

A. Water, 10 ozs.; silver nitrate, 1 oz.
B. Water, 2 ozs.; potassium bromide, ¾ oz.

Mix. Shake. Collect and wash the precipitate and dissolve it in water, 6 ozs.; hypo, 2 ozs. To intensify a plate take of the foregoing stock solution 1 drm.; water, 2 ozs.; pyro, 4 grs.; soda sulphite, 40 grs.; ammonia, 4 mins.

Silver Intensification.

Hot water, 2 ozs.; gallic acid, 5 grs. When cold, add silver nitrate, 10 grs.; acetic acid, 5 mins.

This acts somewhat slowly.

Alternative:—

Alcohol, 1 oz.; gallic acid, 50 grs.; silver nitrate, 10 grs.; acetic acid, 5 mins.

Silver Intensification (Abney's process):—

A. Pyro, 2 grs.; citric acid, 3 grs.; water, 1 oz.
B. Iron sulphate, 5 grs.; citric acid, 10 grs.; water, 1 oz.
C. Silver nitrate, 10 grs.; water, 1 oz.

To A. *or* B. add a few drops of C. and apply to the plate. Clear in a solution of common (table) salt and wash. If stains arise they may be removed by water, 1 oz.; potass. cyanide, 5 grs.

Silver Bromide and Ferrous Oxalate Intensifier:—

(1) A.—Silver nitrate, 120 grs.; water, 3 ozs.
B.—Potassium bromide, 90 grs.; water, 1 oz.

Add B. to A. Shake. Allow the precipitate to settle, pour off the clear part, and add water, 10 ozs. Shake. Allow the precipitate again to settle and pour off the clear part. Then add the precipitate to:—

(2) Hypo, ½-oz.; water, 4 ozs.

Soak the negative in above solution for 5—10 minutes, pour off, rinse, and redevelop with ferrous oxalate developer.

Silver-persulphate Intensification. (Namias's Process).—It is well known that finely divided silver is soluble in a moderately strong solution of ammonium persulphate, hence the reducing property of this salt. It has been found that if such a solution of silver be added to an alkaline developer—such as metol-soda carbonate for instance, the silver is again deposited, *i.e.*, intensification takes place. Thus, an old well-washed negative may be taken and immersed in a 10 per cent. solution of ammonium persulphate, and the solution thus becomes charged with silver. Thus, we may transfer the silver from one negative to another. Further experiments in this direction are much needed.

(A.) In an ounce of water dissolve 35 grains of silver nitrate. Precipitate the metal by suspending in it a piece of pure copper, or throw in copper turnings, shaking frequently. Remove the copper and wash the silver (now as a fine grey black powder) in 10 per cent. hydrochloric acid; finally wash the silver in pure water.

(B.) In 5 oz. water dissolve 1 oz. ammonium persulphate, and add the washed finely-divided silver obtained by (A.)

(C.) In 1 oz. of water, dissolve 2 grs. metol, and add 1 dram of (B.) Apply this to the plate in a quite clean dish. If red staining ensues, wash well in plain water. The process may be repeated. It is better to use small quantities in repeated actions than stronger solutions in one operation, for there is less likelihood of the silver being precipitated on the dish. The action is slow, and effects uniform.

Permanganate Intensification.

A. Water, 2 ozs.; potassium permanganate, 6 grs.

Immerse the plate for 10 or 15 minutes, then rinse and apply the ferrous oxalate developer and wash well.

Intensification may be produced by flooding the plate with an ethereal solution of hydrogen peroxide. The image is also given a degree of relief. Application of water removes the intensification effect.

Iodine Intensification (Krohnke's process).

A. Water, 100 parts; potassium iodide, 2 parts; iodine, 1 part.

Bleach the negative, well wash and transfer to :—

B. Water, 100 parts; Schlippe's salt, 1 part; 10% solution of caustic soda, 2 parts.

Wash well.

In this case the hypo *need* not be very carefully removed before bath A., but the plate should have had moderate washing.

Iron Intensification (Ander's process) :—

A. Water, 1 oz.; potassium ferricyanide, 8 grs.
B. Water, 1 oz.; ferric chloride, 8 grs.; ammonium oxalate, 2 grs.

Mix A. and B. and immerse the plate, which takes on a blue or violet tinge. The intensification effect is only of a moderate degree.

The plate is washed in water containing a few drops of hydrochloric acid. The intensification may be removed by washing in alkaline water.

Various general Intensification Methods by staining, etc. :—

(1) A slightly weak negative may be strengthened by immersing in pyro and water without sulphite.

Fig. 17.

MOUNTING COMPETITION.—CERTIFICATE.

Zeph Carr.

(2) Immersion in an aqueous solution of potassium

Fig. 18. NEGATIVE BEFORE REDUCTION (C. P. 18.) P. C. L.

Another: Water, 5 ozs.; glucose, ½-oz.; albumen, ½-oz. Put in a bottle with a few bits of broken glass and shake thoroughly, then add ammonium bichromate.

Fig. 19. NEGATIVE AFTER REDUCTION. (D. P. 18.) P. C. L.

Fig[t] 18. F. C. L.

NEGATIVE BEFORE REDUCTION

(C. p. 18.)

Fig. 19. F. C. L.

NEGATIVE AFTER REDUCTION.

(D. p. 18.)

(2) Immersion in an aqueous solution of potassium permanganate has a similar effect. Care must be taken not to stain too far, as the stain darkens on drying.

(3) It is stated that an old gold toning bath will slightly intensify a negative, but it seems to be a very slow process.

(4) A.—Water, 1 oz.; potassium bichromate, 20 grs.; nitric acid, 5 drops. Bleach the plate (more or less) and wash well. Darken by immersion in Schlippe's salt, 10 grs. per oz. water.

Intensification by the Powder or Dusting on Process. — Prepare the following solutions. A. Water, 1 oz.; dextrine, 30 grs.; sugar candy, 30 grs. B. Water, 1 oz.; ammonium bichromate, 12 grs. Mix and filter through cotton wool.

(2) Alternative single solution for coating. Water, 2 ozs.; fish glue, 60 grs.; glucose, 6 drms.; glycerine, 2 drops; ammonium bichromate, 60 grs.

(3) Another: Water, 5 ozs.; glucose, ½-oz.; albumen, ½-oz. Put in a bottle with a few bits of broken glass and shake thoroughly, then add ammonium bichromate.

(4) A. Water, 5 ozs.; dextrine, ½-oz.; grape sugar, ½-oz. B. Water, 5 ozs.; ammonia bichromate, ½-oz. These two solutions will keep separately for some considerable time. For use, mix equal parts of A. and B., and filter.

With a pneumatic holder, hold the plate glass side up and coat the glass side with the above mixture exactly in the way that the varnishing of a negative is done (*vide* page 26). The plate is now dried over a gas stove in the dark-room or in a room with the blinds down. The coating should dry quite smooth and hard, just like ordinary varnish. The plate is now put in a printing frame, film side out, and with a piece of black velvet or cloth in contact with the side coated in the manner just described. It is now exposed to sunlight for a period varying with the density of the negative and the strength of the light. An average exposure would be 1 to 3 minutes to bright diffused summer sunlight. It is now taken to the dark-room and

laid film down, *i.e.*, coated side up and allowed to rest for a few minutes. In a saucer is put a little very finely ground plumbago. With a soft camel's hair "mop" brush, this plumbago is lightly dusted over the coated side. The plumbago adheres to those parts of the coating that have been protected by the denser parts of the negative. But when light has passed through the thin parts of the negative, the bichromated coating has been hardened and the plumbago does not adhere. After exposure, a little time in a slightly damp atmosphere must be allowed, so that the parts of the film, unaffected by light, may absorb moisture and become slightly "tacky," *i.e.*, sufficiently sticky to hold the powder. Of course, other fine dry powders may be used in place of plumbago, but this substance has many advantages.

Intensification having been carried far enough, the plate is again exposed to strong light for several minutes to make all parts of the coating non-absorptive. In case of failure, the coating may easily be removed and a second attempt made.

If preferred, the coating may be applied to the film side. But in that case the film should be first varnished. To make the coating flow easily on the varnished surface, it should be polished with a bit of rag and a dash of whiting. The beginner is advised to make his first few experiments by means of some form of actinometer. If the powder adheres all over, the exposure has been insufficient to render the coating hard. If it adheres nowhere, then the light exposure has been too long, and light has penetrated the dense parts and hardened the coating.

Intensification by Heat.—Soak the plate in water and blot off all moisture. Then hold the negative with glass side towards a fire, watching carefully. At a certain temperature it will bring out the image in low relief, and with moderate intensification effect. If carried beyond this stage the gelatine will swell and the negative be destroyed. The warmed plate is allowed to cool spontaneously.

REDUCTION.

General Considerations.—Let the reader bear in mind that reduction of a negative means two things. (1) The conversion of the material of the image—silver or some other substance into a soluble form; (2) the removal of the dissolved image from the film. One might add a third matter, *viz.*, the need for care lest what dissolves the silver will also dissolve or soften the gelatine, and bring about the ruin of the negative.

If these two operations of changing and dissolving go on simultaneously, as in the hypo and ferricyanide process, then reduction can be stopped at any desired moment. But if the reduction is done in two separate operations, *i.e.*, in two baths as in the ferric chloride and hypo baths, then the difficulty of knowing exactly how much reduction will finally be made is by no means easy. Hence the general preference for single solutions rather than two bath processes

In judging the effect of any two-bath process, one must bear in mind the brand of plates used, as some gelatines are more permeable than others; the strength and temperature must also be held in mind. Again, some chemicals show more change of colour than do others.

Ferrocyanide and Hypo Reducer (Howard Farmer's Process).—Prepare (A) a saturated solution of potassium ferricyanide and also (B) one of hypo.

(1) For a hard-contrast, over-developed negative with delicate shadows, take equal parts of A and B. Immerse the negative quickly and steadily, give one swirl round, and remove at once to the spray tap. The negative must not be in the reducing bath more than three seconds at most. After a minute under the tap it may be examined, and, if need be, the operations repeated. In this case we desire to keep the reducing action to the surface layers of the film, and not allow time for the solution to penetrate deeply.

(2) For a soft, weak-contrast negative, where it is desired to attack the thinner deposits, we must use a very dilute reducer, and allow ample time for it to penetrate the entire film. This may take five or ten minutes. We may use five to ten drops of A plus 2 drms. of B per oz. water. In such a case the thinner parts (shadow details) are materially reduced without making very much difference to the denser portions.

(3) Intermediate strengths of solution have a corresponding intermediate action, and are suitable for correctly exposed but over-developed negatives.

(*a*) It is highly desirable that the negative be washed free from pyro stain before this reducer be applied, but of course it need not be washed free of hypo.

(*b*) It is also important that there be enough hypo present to dissolve the silver ferricyanide as quickly as it is formed.

It should not be forgotten that the activity of this reducer only lasts a few minutes. It therefore cannot be kept as a stock solution. It is wise after say ten minutes' use to mix up a fresh lot and throw away the first lot.

Reduction of Contrasts of under-exposed and over-developed negatives. Coat the film side with collodio-chloride of silver. Dry in the dark. Expose to light from the back, using a pad of black cloth against the coating. Over rather than under-print on account of subsequent loss. Wash in water, then in salt and water, with a few drops of ammonia added. Fix, but not tone, and again wash. If deposit is too dense, it may be removed by potassium cyanide. To make the action uniform all finger-markings should be removed by a brief bath of dilute alcohol before reducing, then washing in water until the streaky look is gone. If the operation is unsatisfactory, the film may be removed by rubbing with a tuft of cotton wool and equal parts of alcohol and ether.

Copper Reducer (Lambert's Process).—

A. Water, 1 oz.; copper chloride, 50 grs.
B. Water, 1 oz.; hypo, 2 drs.

Add A to B. After reduction reblacken by immersion in dilute ammonium sulphide.

Fig. 20. R. W. Cole.

BEFORE REDUCTION.

Fig. 21. R. W. Cole.

AFTER REDUCTION.

Fig. 22. F. C. L.

BEFORE REDUCTION.

(CC p. 18).

Fig. 23. F. C. L.

AFTER REDUCTION.

(DD p. 18).

Copper Chloride Reducer.—

(1) Water, 1 oz.; copper chloride, 3 grs.

Wash and pass through fixing bath.

(2) Water, 1 oz.; copper sulphate, 4 grs; sodium chloride, 6 grs.

Use as No. 1.

(3) A. Water, 10 ozs.; alum, 1 oz.; copper sulphate, 1 oz.; table salt, 2 oz.

B. Saturated solution of table salt.

Take equal parts of A and B. When the plate is reduced, soak for ten minutes in B and wash well.

Copper-Bromide Reducer.—

A. Water, 10 parts; copper sulphate, 1 part.

B. Water, 10 parts; potassium bromide, 1 part.

Mix A and B and dilute until the mixture is a pale green-blue colour. Bleach more or less as required, wash, and pass through the usual hypo fixing bath.

Copper Reduction.—Into a strong solution of copper sulphate is poured a strong solution of soda carbonate (exact strength immaterial). This throws down a precipitate of copper carbonate. This is well washed and collected on a filter. It is then dissolved in hydrochloric acid 2 parts, water 5 parts. Ammonia is then added until the precipitate first formed is redissolved. This forms our stock solution of copper. Of this take 20 parts, add water 70 parts and saturated solution of hypo 10 parts. This forms an energetic reducer, which may be diluted with an equal bulk of water to slow its action, if desired. It does not keep long.

Bichromate Reducer.—Water, 4 ozs.; potassium bichromate, 80 grs.; sulphuric acid, 40 min. Bleach more or less as required and pass through the fixing bath.

Bromide and Cyanide Reducer.—Water, 10 ozs.; potassium cyanide, ½-oz.; bromine water (saturated solution), 2 drms. If any stain arises, pass the negative through a clearing bath of water 20 ozs., hydrochloric acid, 2 drms.

Hypo Reduction.—If a plate be immersed in a clean hypo fixing bath, and then exposed to the air while wet for, say, ten minutes, and again returned to the hypo and so on, reduction takes place.

Gold Replacement and Reduction.—Water, 1 oz.; potassium sulphocyanide, 20 grs.; mercuric chloride,

5 grs. Of this take 30 min. and to it add gold chloride 1 per cent. solution, until an orange-yellow precipitate begins to form. Apply this solution to the negative by means of a tuft of cotton wool. The only change is a slight general brightening. The silver is now removed by ferricyanide and hypo, leaving a negative with reduced contrasts, but without loss of shadow detail.

Uranium Reducer.—The plate is first treated just as though intensification by the uranium process were in contemplation. It is then lightly rinsed and transferred to an ordinary clear hypo fixing bath. (Doubtful value.)

Mercuric Potassic Cyanide Reducer.—Water, 1 oz.; mercuric chloride, 1 gr.; potassium iodide, 1 gr.; potassium cyanide, 2 grs. This acts steadily and slowly, first removing surface fog and then gradually dissolving out the image.

Potassium-Iodine Cyanide.—Water, 1 oz.; potassium cyanide, 20 grs. Add iodine dissolved in alcohol, a few drops at a time. If excess of iodine be added, the entire image will be removed.

Mercury Bleaching Reduction.—If a strong contrast negative be bleached in the usual mercuric chloride bath, well washed in water 20 ozs., hydrochloric acid 20 mins., and dried, it will be found to print with less contrast than before.

Reduction after Intensification with mercury and ammonia. Immerse the over-dense plate in a clean hypo fixing bath of normal proportions.

Chromic Acid Reducer.—Water, 1 oz.; chromic acid, 3 grs.; potassium bromide, 6 grs. Bleach more or less and fix.

Potassium-Ferricyanide and Bromide Reducer.—Water, 1 oz.; potassium ferricyanide, 10 grs.; potassium bromide, 10 grs. Bleach and wash and dry. This gives a softening-of-contrasts effect.

Potassium-Sulphocyanide (Haddon's Process).—Water, 1 oz.; potassium ferricyanide, 5 grs.; ammonium-sulphocyanide, 10 grs. This does not require such prolonged washing after reduction as is required by the hypo and ferricyanide process.

Potassium Permanganate Reducer.—Water, 20 ozs.; potassium permanganate, 4 grs.; sulphuric acid, 30 mins. After reduction the negative is likely to

show same stain, but this can readily be removed by a bath of oxalic acid 5 grs., water 1 oz., or a dilute solution of potassium metabisulphate may be used. Many of the published formulæ are far too strong, and stain rather than reduce the film.

Ceric Sulphate Reducer.—Water, 1 oz.; sulphuric acid, 5 mins.; ceric sulphate, 50 grs. For use, dilute one part of above with 8 or 10 parts water. The general action of this agent is very similar to hypo and ferricyanide. It is important to dissolve the ceric sulphate in a minimum of water to which the acid has been added, or a larger quantity of acid will be required than is (for other considerations) desirable.

Eau-de-Javelle Reduction.—

A. Chloride of lime, 5 grs.; potassium carbonate, 10 grs.; water, 1 oz. Boil this for a minute or two, then filter.
B. Chrome alum, 10 grs.: water, 1 oz.

Take equal parts of A and B.

Ferric-Oxalate Reducer.—

A. Water, 1 oz.; ferric chloride, 120 grs.
B. Water, 1 oz.; potassium oxalate, 60 grs.
C. Water, 5 ozs.; hypo, 1 oz.

Take one part A, one part B and ten parts C.

Iron Reduction.—(Lambert's Process.) A In 2 ozs. water dissolve 9 drms. ferrous sulphate, add 1 drm. sulphuric acid, warm to 120° F., add nitric acid slowly until liquid is clear deep orange. Dilute to 4 ozs. For use take 1 drm. A, 12 drops sulphuric acid, water to make 1 oz. (Reduces contrasts.)

Belitzski's Reducer.—(1) Water, 100 parts; potassic ferric oxalate, 5 parts; soda sulphite, 4 parts. Oxalic acid just enough to turn the solution green. Then add hypo 25 parts previously dissolved in water 50 parts.

(2) Water, 5 ozs.; potassic ferric oxalate, 200 grs.; soda sulphite, 180 grs.; oxalic acid, 75 grs. Shake until solution turns green, then pour off from undissolved oxalic acid and add hypo 2¼ ozs.; water, 10 ozs.

(3) Jareki's modification: In place of the 200 grs. potassic ferric oxalate in No. 2, substitute ferric chloride 60 grs.; potassic oxalate, 120 grs.

This solution keeps for some considerable time in the dark, and may be used repeatedly, but should be discarded when it turns from green to yellow. The plate should be well washed after reduction, but need not be washed quite free of hypo before the solution is used. It does not stain and often removes developer stains.

If made with tap or well water containing lime a milky appearance may result. If desired this may be allowed to settle, and the clear part decanted for use. The presence of the lime precipitate does no harm, but the surface of the negative should be well rubbed with cotton wool before setting up to dry. This reducer does not "eat out" the shadow detail so much as the hypo and ferricyanide process.

Ammonium Persulphate Reducer.—

A. Water, 1 oz.; ammonium persulphate, 12 grs.
B. Water, 1 oz.; soda sulphite, 25 grs.

The plate is immersed in A. The film surface should occasionally be swabbed with a tuft of cotton wool, The action lags somewhat at first, but when once started goes on fairly rapidly. When nearly sufficient reduction has taken place the plate is removed, dipped in water, and then covered with B, which stops action much more quickly than plain water. It does not keep in solution, and if used at all stale may yield pinkish stains. Its general tendency is to reduce contrasts, and it is therefore particularly valuable in the case of under-exposure followed by over-development, resulting in exaggerated density contrasts. After the sulphite bath the plate should have five minutes in a clear hypo fixing bath, and subsequent good washing.

Ammonium persulphate is certainly one of the most useful agents given to modern photography, despite the many complaints of its failures, These are chiefly if not entirely due to lack of two precautions. (1) Imperfect fixing; (2) imperfect washing after fixing. In the first case spots, stains and patches result. In the second case the hypo breaks up the persulphate and prevents it acting as a reducer, and probably results in staining. Solutions stronger than 2½ per cent, or say 12 grs.

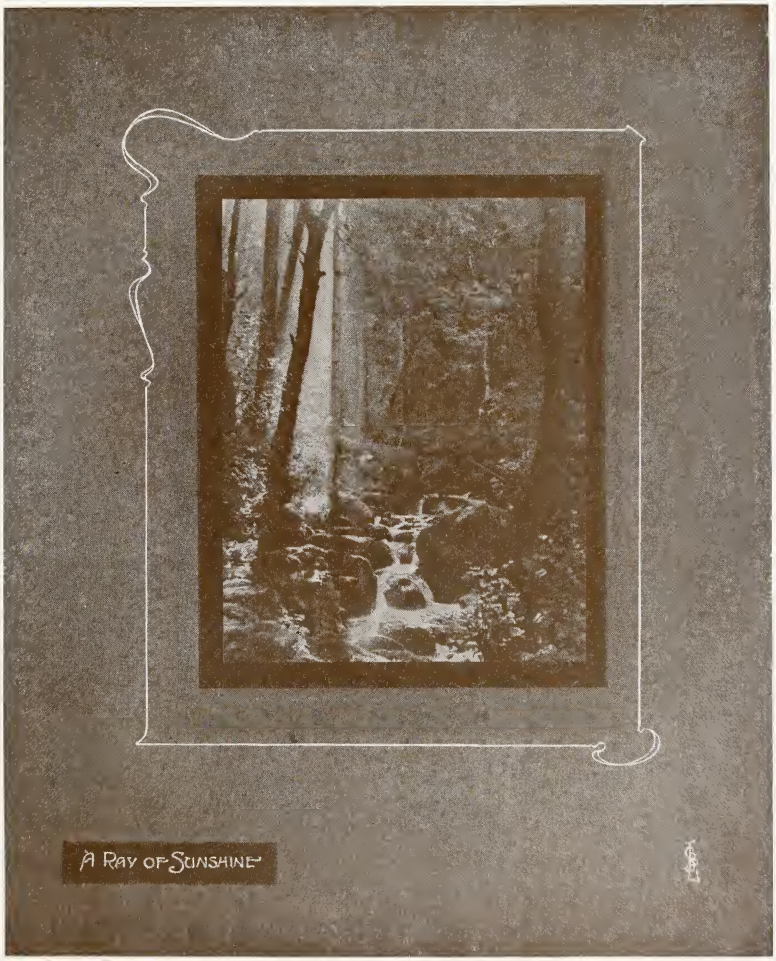


Fig. 24. S. B. Lupton.

MOUNTING COMPETITION.
Bronze Medal.

one of the rehalogenising baths given on page 58, when it turns a light yellow colour. It is then washed and transferred to any ordinary developer (Pyro is not a general favourite). The developer should be weak and slow acting. The plate is

gives cloud and landscape at one printing.

NEGATIVE AFTER TREATMENT.

Fig. 25. F. C. L.

NEGATIVE BEFORE TREATMENT.

(E p. 18.)

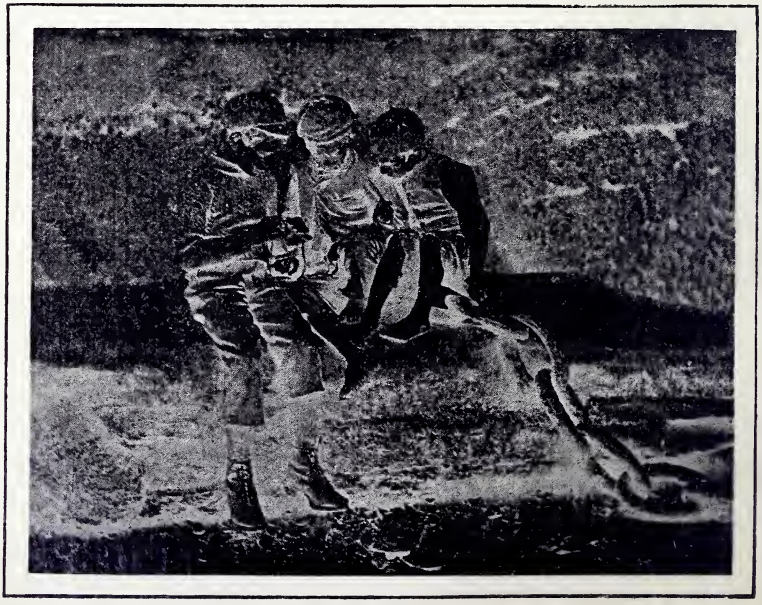


Fig. 26. F. C. L.

NEGATIVE AFTER TREATMENT.

(F. p. 18.)

per oz., are liable to be irregular in their action, and so should be avoided. The activity of the solution may be stimulated by the addition of twenty drops of a 1 per cent. (say 5 grs. per oz.) solution of silver nitrate to the ounce of reducer.

Ammonium Persulphate with Sulphocyanide.—Water, 1 oz.; ammonium persulphate, 25 grs.; ammonium sulphocyanide, 12 grs. The addition of the sulphocyanide entirely changes the character of the action of the persulphate. This reducer is now much more like ceric sulphate or ferricyanide and hypo, *i.e.*, giving additional contrasts, and suitable therefore for flat, strong negatives.

Redevelopment.—This process consists in converting the silver image into silver bromide, etc., and then redeveloping. The plate is immersed in some one of the rehalogenising baths given on page 58, when it turns a light yellow colour. It is then washed and transferred to any ordinary developer (Pyro is not a general favourite). The developer should be weak and slow acting. The plate is watched from the back as well as the front, for it is not desired to redevelop all, but only a portion of the original image. As soon as the shadow details are darkened the plate should be closely examined, and the half-tones watched. As soon as they are sufficiently darkened, and *before* the highest lights have redeveloped right through the film to the back of the plate, it is plunged into the fixing bath. This gives us a negative of a shorter scale of densities, and in general roughly corresponds to the effect obtained by reducing with such agents as ammonia persulphate. The process is useful in cases of halation, *e.g.*, windows, foliage, white lace, etc., care being taken to arrest redevelopment before action has penetrated to the glass side of the film. Redevelopment is best carried out in subdued daylight. The plate must again be thoroughly fixed and washed. If need be, further density can be given by intensification. By this means it is sometimes possible to convert a dense sky in which the clouds, though visible, are buried in density to one which gives cloud and landscape at one printing.

The action of redeveloping should be stopped a trifle before the required stage is reached, as development goes on for a few seconds after the plate has been removed from the developing solution.

This is one of the useful ways of making the best of an under-exposed and over-developed negative.

Rehalogenising Baths.—

(1) Water, 10 ozs.; chromic acid, 30 grs.; potassium bromide, 60 grs.
(2) Water, 10 ozs.; potassium bichromate, 1 drm.; hydrochloric acid, 100 mins.
(3) Water, 10 ozs.; potassium bichromate, 200 grs.; potassium bromide, 50 grs.; nitric acid, 50 mins.
(4) Water, 10 ozs.; copper chloride, 100 grs.; hydrochloric acid, 100 mins.

After bleaching, wash thoroughly.

A trace of soda sulphate in the washing water will help to keep the high-lights clear and get rid of stains.

Any developer may be used, but pyro and quinol do not seem so suitable as others, *e.g.*, amidol, glycin, pyrocatechin.

Developers after Rehalogenising.—

(1) Water, 4 ozs.; soda sulphite, 50 grs.; potassium carbonate, 80 grs.; glycin, 16 grs.
(2) Water, 1 oz.; soda sulphite, 15 grs.; amidol, 2 grs.; alcohol, ½-oz.
(3) A. Alcohol, 1 oz.; pyrocatechin, 5 grs.
B. Alcohol, 1 oz.; caustic soda, 2 parts; use equal parts of A and B.
(4) Normal ferrous oxalate developer.
(5) Water, 10 grs.; soda sulphite, ½-oz.; pyro, 20 grs.; ammonia, 5 to 10 min.

Local Treatment, *i.e.*, reducing or intensifying a portion of a negative, is one of the great aids to pictorial work. It is the skilful and artistic use of local control in preparing the negative and producing the print that often makes all the difference between an ordinary and an artistic picture. The worker will really show his skill by doing his work in such a manner that it shall be difficult, if not impossible, to say where the local treatment begins and ends.

It is important to bear in mind that local treat-

ment may—often does—change not only the density, but also the colour of the image. This has, of course, to be taken into account, and the only really satisfactory way of knowing if the alteration is that which is desired is by taking a print. For the eye, at best, can only form a very rough guess as to the printing value of these local changes.

If a negative be bleached all over with the usual mercuric chloride bath, we may then locally darken certain parts by means of dilute ammonia applied with the aid of a brush or tuft of cotton wool. Again we may apply ammonia gas locally in the following way:—Fit a small bottle with a well-fitting cork. Bore a hole in the cork, and pass through it a bit of glass tubing with its outer end slightly "drawn" to a narrower bore. Strong ammonia is put in the bottle. The warmth of one's hand causes the dissolved gas to escape and pass through the glass tube, which may be used as a darkening pencil or gas brush. The undarkened part will print darker than the darkened part.

Solutions such as the ferricyanide and hypo reducer, or uranium intensifier, can be locally applied by means of brush or bit of cotton wool stuffed into the end of a glass tube. For this treatment we may either start with the negative quite dry, or we may soak the negative in water until the film is fully saturated with water, and then remove all adhering water by dabbing with clean rag or a sheet of fluffless blotting paper. The water in the film tends to soften the otherwise hard edges. A third method is to add to the aqueous solution some strong gum arabic solution or glycerine, so as to prevent the mixture flowing and spreading. If very soft edges are desired, then the film is wetted all over, and the solution applied with a tuft of cotton wool to the wet surface. In this way the intensifying or reducing agent diffuses into the surrounding water.

Local Treatment by means of coloured solutions is a quite possible plan of action. For instance, a strong solution of gum arabic may be stained red or yellow with the penny packets of dyes obtainable at oil shops. This may be applied either to the film or glass side.

Again, plain collodion or matt varnish may be coloured by some convenient aniline dye. These methods, however, belong more to our volume on retouching (now in preparation) than to the chemical treatment of the negative.

Local Treatment by the Protection Method.—This consists in coating those parts of the negative which it is desired to retain in their present condition by some water-resisting substance, and then placing the negative in a reducing or intensifying solution, as the case may be.

For this purpose we may use a somewhat dilute solution of pure masticated rubber, dissolved in benzole or chloroform, and apply this with a brush to the parts to be protected. This film can be removed by gently rubbing with the finger when it peels off as a thin pellicle, or it may be dissolved away by benzole or any other similar rubber solvent.

Similarly pure white wax (N.B., *not* white paraffin wax) dissolved in chloroform may be used.

Again, an old film may be cleaned by hot water and a nail brush; then cut up into shreds and dissolved in amyl acetate, and used as a protecting varnish applied locally.

The Uranium Method lends itself particularly well to our needs, because in case of failure it is quite easy to restore the negative to its original condition, and begin again *de novo*. The whole negative is intensified in the way already described on various pages of this volume, then surface dried by dabbing with a rag or fluffless blotting paper, and then the parts painted over with dilute ammonia or soda carbonate, and blotted off. If the plate be put under the tap to wash away the reducing alkali, it will surely spread to parts where it is not wanted. To prevent this we may coat the surrounding parts with gum and allow to dry, and as an additional precaution we can thicken the alkali by the addition of glycerine, as already mentioned.

Local Treatment by the Powder Process is obviously simply a matter of applying the powder with the mop brush to those parts only that it is desired to intensify (*vide* page 49).

Fig. 27 S. C. Johnson.

LOCAL INTENSIFICATION.—BEFORE TREATMENT.

Fig. 28. S. C. Johnson.

LOCAL INTENSIFICATION.—AFTER TREATMENT.

Fig. 29. F. C. L.

BEFORE COMBINED TREATMENT.

(EE p. 18).

Fig 30. F. C. L.

NEGATIVE SLIGHTLY REDUCED, THEN INTENSIFIED.

(FF p. 18).

To prevent the powder shifting it is a good plan to coat the surface with plain collodion just as though one were varnishing a negative in the usual way.

Local Intensification.—Prepare this solution: Water, 150 parts; gum arabic, 120 parts; glycerine, 20 parts; when dissolved add alcohol, 50 parts. With a brush apply this to the parts requiring little or no intensification. To facilitate fine detail work being seen, a little water-coloured earth, *e.g.*, Vandyke brown, may be added. When dry, put the negative in the mercury bleaching bath, but not long enough time to dissolve the dried gum. If darkened now the patches would not join well or harmonise; so that we now wash away the gum and return the negative to the bleaching bath until the parts harmonise, then wash and darken in the usual way.

Developer Stains may arise when the developer has become stale owing to time alone. Thus amidol in solution keeps but a few hours. Others keep fairly well for weeks or months if in a well-closed bottle; but a badly fitting cork may spell ruin to the contents of the bottle. Again, the developer may be poured out into a graduate and gradually take on a scum if forgotten for a while. This, again, will produce stains and markings. Some developers throw down a sediment in the stock bottle. This also will give spots and stains. Cleanliness is very needful at every stage of negative making; thus dishes and measures should be well washed out after and before use each time. Some developers will throw down deposits which cling more or less to the sides of the measures and dishes. These should be removed by a bottle brush or bit of loofah.

Oxidized Developer.—Yellow or brown all over the negative. Caused by too little preservative in the developer (*vide The Practical Photographer*, No. 6, page 32), or prolonged exposure of the plate to the air during development, stale developer, etc. Removed by alum and acid, or sulphite and acid, or bleaching powder and acid baths.

Quinol Developer Stains are often of a very obstinate character. A remedy which acts satisfactorily with one brand of plates may fail with another, owing probably to the difference in the gelatine. The following in some cases removes them:—Water, 2 ozs.; hydrochloric acid, 10 drops; potassium bichromate, 10 grs. Bleach the image slightly, wash well, and redevelop with some other developer, such as metol, ortol, etc.

Should this fail, it is well next to try a weak hypo and ferricyanide reducing bath, such as water 2 ozs., hypo ¼-oz., ferricyanide 10 grs.

To guard against this reducer leaving a stain in place of that removed, it is well to pass the plate through a clear hypo fixing bath after the weak reducing bath just given.

Yellow Pyro-Stained Negatives may be improved in colour by—

(1) Water, 4 ozs.; ammonium sulpho-cyanide, 15 grs. gold chloride, 1 gr.

(2) Water, 1 oz.; potassium bichromate, 10 grs.; hydro chloric acid, 10 mins.

When the negative is bleached right through the film, wash well and redarken by any alkaline developer, such as metol, quinol, etc. (See section on Redevelopment.)

(3) Water, 20 ozs.; bleaching powder, a teaspoonful; washing soda, a teaspoonful.

Shake well; allow any undissolved part to settle, and decant the clear part for use.

(4) Equal parts of ordinary hypo fixing bath and glycerine.

This is evenly and freely coated on the plate, and the plate thus wetted is allowed to remain wet for an hour or two.

(5) Water, 1 oz.; soda sulphate, 1 drm.; sulphuric acid, enough to produce a smell of sulphurous acid gas.

Developer Stains, Removal of.—

(1) Water, 10 ozs.; sodium sulphite, ½-oz.; sulphuric acid, 100 mins.

(2) Water, 20 ozs.; bleaching powder, 2 drms.; hydrochloric acid, 2 drms.

Shake thoroughly, and filter off clear part for use. Immerse the negative until the stain is cleared; then wash well and expose to strong sunlight, or darken by a bath of ferrous-oxalate developer (page 15).

Developer Finger Stains may often be removed by ink eraser or pumice stone, or may be prevented by wearing rubber finger-stalls. Pyro stains generally disappear if the stain be rubbed with a large crystal of citric acid, or lemon juice, or a little powdered ammonium persulphate. Lanoline rubbed into the fingers before developing is commenced will help to prevent the skin staining.

Colour Fog or Stain due to oxidation products of the developer.—Water, 100 parts; liquid bromine, 3 parts; potassium bromide, 10 parts. This bleaches the image. It is now exposed to light, and redeveloped by quinol, when the colour stain will not reappear.

Lime Stains due to ferrous oxalate developer.—Water, 20 ozs.; alum, ½-oz.; hydrochloric acid, 60 mins. Rub the surface of the plate with a swab of cotton wool moistened with this bath, and rinse under the tap. Repeat until the negative is bright and clear.

Sulphur.—Yellow-brown, local or general. Caused by imperfect fixing, exhausted fixing bath, acid in the fixing bath, alum mixed with hypo, etc. Very difficult to remove. Dilute solution of sodium or potassium sulphide may be tried, the plate then well washed, bleached and redeveloped.

Iron.—Yellow colour after the use of ferrous oxalate. Caused by not washing out the developer in acid water. Try 10 to 15 drops hydrochloric acid per oz. water.

Stains with the Hypo and Ferricyanide Reducer.—In many cases these are due to lack of precaution in having excess of hypo. It is a good plan first to soak the negative in a clear hypo fixing bath for, say, five minutes at least, then to transfer to the hypo and ferricyanide bath, and again give few minutes in plain hypo. If this plan be followed stains will be unknown. A dirty hypo bath or acid reducer is very likely to give stains.

Blue or Green Stains in connection with uranium intensification point to iron contamination, *e.g.*, splashes of iron solutions, particles of iron from the supply tank or pipes, using iron dishes, etc.

Stains from local use of Belitzski's reducer may be removed by a bath of water, 100 parts; alum, 5 parts; hydrochloric acid, 1 part.

Dichroic Fog follows the use of a developer which contains a solvent of silver bromide, *e.g.*, hypo, ammonia, potassium cyanide; or may appear in the fixing bath if this is contaminated by developer. Liable to follow under-exposure. Procedures for removal:—

(1) Soak the plate in a semi-saturated solution of sulphuretted hydrogen. This will yield a layer of silver sulphide on the surface of the film which can be rubbed off, or
(2) Place in acid permanganate, ceric sulphate, or ammonia persulphate reducers.
(3) Place in water, 1000 parts; potass. permanganate, 1 part. Wash and transfer to 5 per cent. solution of sodium bisulphite. Discoloration, if any remains, can be removed by dilute oxalic acid solution.

Fog formed, during development, is more superficial than that formed during fixing.

Green fog is generally greatly reduced, if not entirely removed, by intensification by the mercuric chloride and soda sulphite process, also by the mercuric bromide and soda sulphite process.

Green fog is more likely to follow development with ammonia, than with the carbonate alkalies. It is seldom or never seen after ferrous oxalate development. Green fog often gives way in the ferrous sulphate and alum-clearing bath.

It may often be greatly reduced, if not removed, by treatment with weak ferricyanide and hypo reducer.

Fog, *i.e.*, a slight veiling all over the negative (*vide The Practical Photographer*, No. 6, page 62). This may arise from about thirty different causes, too numerous to discuss here. The remedy at this moment is more important than the cause. In general, the cure is the use of a dilute reducer, which acts slowly so as to be under control, so that while it removes the fog it does not (materially) affect the shadow detail. Use aids for fog removal, *e.g.*,

(1) Ferricyanide and hypo reducer.
(2) Water, 1 oz, ; hypo, 2 drms. ; thio-carbamide, 10 grs.
(3) Water, 1 oz. ; citric acid, 10 grs. ; thio-sinamine, 10 grs.

Mounting Competition.

W. B. Topping (Manchester), (Sp. Cat.)—"The Woodlands Fair." This example (fig. 10) shows a highly creditable piece of carpentry. A thin piece of teak is cut out with a rebate edge opening which gives us a result partaking of the nature of both mount and frame. The author says: "The print is enlarged from a Frena film negative by daylight. Exposure $1\frac{3}{4}$ minutes. Cloud exposure 30 seconds. Light good. Camera pointing east, 4 p.m. Print developer rodinal, toned soda sulphide. Wellington & Ward P.M. rapid bromide paper." The tint of print, narrow mount and frame harmonize admirably. The monogram signature is a little too large and conspicuous.

S. B. Lupton (Harrogate).—"A Ray of Sunshine." In this instance we have a contrast scheme of colours. The hypo-alum toned print is a warm sepia colour. Next comes a dark-green inner tint and then the outer tint of a quiet soft greyish green. The label is of the same colour as the inner tint. The title, decorative line and monogram are in white. The surface of the outer tint paper has a pleasantly rough texture. The ray of strong light darts between the group of upright tree trunks and forms a *motif* for the picture. The light on the water is a little too strong. The scroll line is decorative and tasteful, each corner being suitably varied. The title label, well placed, is perhaps a little too conspicuous in tone contrast. It is not easy always to hit the happy mean between distinction and quietness. The general effect is excellent. (Fig. 24.)

Zeph Carr (Sheffield).—This print well illustrates the third or neutral tint style of mounting, which, like the other two systems, has its advantages. The picture is in black and white, evening clouds being well suggested. Then comes a band of white which in this case, no doubt, was designed to accentuate the strong darker shades of the picture. Then we have an agreeable neutral grey bearing a brownish grey band. The outer tint is a very pleasant and quiet greenish grey. This also bears a narrow band. The lettering and signature are in black and subdued white. The turn of poetic thought in the title is a happy touch. The lettering is neatly done, but perhaps a trifle too insistent as it catches the eye too soon. In this case there is perhaps a slight tendency towards over-decoration of the mount. The work generally is very neat, full of promise and worthy of much praise. (Fig 17.)

W. Weaver-Baker (Peterborough). "An Orchid."—A case of harmony between mount and picture. The vase holding the blossom is quite wisely subdued. The inmost very narrow band is not white but cream colour. Next comes a warm brown yellow band, harmonizing admirably with the general colour of the print. Finally a brown outer paper with a surface just slightly hairy, these touches of light colour harmonizing with the colour of the print. The lettering is neat in form, picturesque in design, legible but not obtrusive. The general effect is deserving of great praise. This is an admirable example of a mount performing its proper function of helping the print. This worker has evidently learned the valuable lesson of "simplicity gives strength." (Fig. 8.)

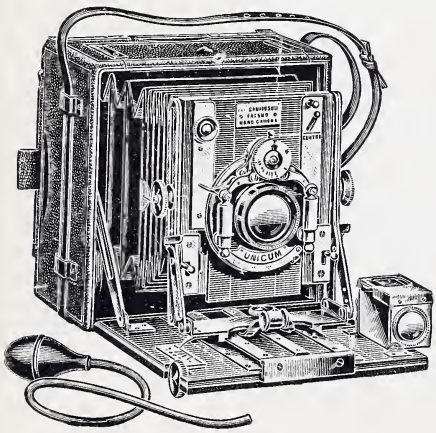
J. B. (Falkirk).—1. The white surround is too strong, for by force of contrast it makes the high-lights of your sky look dull grey instead of suggesting the brightness of summer sunshine and shower. The composition is good and graceful. Your letteting is a little too large. 2. Flowers a little too black and white. so suggesting hardness. Here again the white band overpowers the high-lights of the print. The picture is a little overcrowded with subject-matter.

R. P. D. (Glaisdale).—The label on which you have put the title and your signature is too large in size and too light in colour; hence it is the first thing to catch the eye. It almost makes one forget the print. This is rather too black and white; too strong contrast. Here again the band of black and white round the print is too strong. For this print a dark brown mount with a slightly lighter brown band would be preferable.

J. F. W. (Glasgow).—The colour of your print and mount is in very good taste, but the narrow band of light round print and edge of mount is a mistake, and gives a "liney" effect. Your print is rather too square in shape, and seems to need more sky. The vessels come about half-way up and divide the picture space in two nearly equal parts.

IS IT A SANDERSON?

That is the question your friends will ask you when you tell them you have bought a new Camera. Don't be led into buying just any Camera because it seems to be all right. Remember, all Cameras can be divided into two classes—Sanderson's and other makes. You don't want to be out in the cold with a Camera that no one else has heard of. The Sanderson Hand Camera is like no other. There can be no "just as good" about an imitation, because the Sanderson is patented and protected so carefully that infringement is impossible. The great beauty of the Sanderson lies in the fact that a more simple Camera to use could not be constructed, yet its reserve adjustments embrace a range of movements never before embodied in a single instrument, and make it capable of executing work of the most extreme character. It is light and compact, has a long extension for telephoto work and copying same size, while the enormous rise (with swing front) allows you to take high objects at close range that would be impossible with any other Camera. Ask for a Sanderson Booklet, and don't be persuaded into buying any other kind of Camera that you will be ashamed of later on. No one who has ever used a Sanderson is content with any other make. There is no other Camera like it, that's why.



Prices vary considerably, but the Sanderson Patents are embodied in every model. Finish and Lens value make the differences. The Junior Model costs £5 10s. The Regular Model is £6 10s. The Tourist (a lighter variety) is £6. The Roll Film Model is £6 17s. 6d., and the De Luxe Model costs anything from £10 up.

The Sanderson Specialists are Houghtons, Ltd., of 88 and 89, High Holborn, W.C. Write and ask them for that Booklet. It's free.

J. S. (Hastings).—Please put your name and address, clearly written on the back of each print. The tree part of your print is far too dark and solid-looking, The sheep are too much in a row. A flimsy mount is a mistake, and soon gets crumpled and looks untidy. White ink or paint rather too conspicuous; for title-writing requires toning down slightly. The title should not be qutie so conspicuous. One should not notice a title until it is actually looked for.

R. L. (Castlemartyr).—You have erred on the side of too many lines and bands round your prints. The prints are both pleasing compositions, though not without weak points. The titling and monograms are neatly executed. Aim at greater simplicity in general style of mounting. Better to err on the side of too little than too much contrast in the mounting papers.

J. B. (Bristol).—Bear in mind not only light and shade, but also colour contrast between your warm red print and cold bluish mount. This is far too pronounced for a subject where it is desired to suggest warmth and summer sunshine.

C. J. W. (Brighton).—The writing of the title is very neat and carefully done, but you have made the letters far too large. The first thing one sees is not the picture, but the title. This is quite the wrong way round. The letters should not be more than one-third their present size.

Print Criticisms.

For List of Awards, etc., *vide* page IV.

E. F. Oakshott (Ealing) "Practice."—This print shows how subjects for pictures may be found in the home. The figures are appropriately posed. (The turn of the pianist's head is particularly noteworthy). The chair to our left should have been moved out of the picture. The camera should have been lowered to avoid the strong uprising perspective effect of the floor. Your mounting paper is too flimsy. We have replaced this for reproduction. (Fig. 9.)

C. B. Alexander (London).—"Russet Lawns." An enlargement from a small negative taken at 3 p.m. January. Dull weather. Special rapid plate *f*/11; exposure $\frac{1}{8}$-sec. The distance is admirably suggested. The sky part is somewhat vacant, so that in our reproduction we found it necessary to slightly tone this down. As regards composition the nearer half-dozen animals are rather too much in a row across the foreground. The exposure has not been quite long enough to give modelling to some of the near dark cattle.

C. E. Few (Guildford).—"Roses." This again is an enlargement from a quite small original. It well illustrates the pictorial effect due to breadth of light and shade arrangements. The faults here are a slightly conscious expression and a large blank light space which suggest white paper rather than a window. This should have been slightly subdued. The sitter should have been busy arranging the flowers. (Fig. 14.)

H. B. Cookson.—"The Village Smithy." A bit of very creditable work. (Warwick plate *f*/6.5; exposure 1/15-sec.; July, 10 a.m. Diffused light, carbon print.) As a composition it is a little overcrowded with subject matter, and the leading lines have a tendency to run parallel and diagonally from right to left (*e.g.*, the several strongly marked parallel lines in right upper corner; back of house; relative position of men; fall of roadway, etc.) This might have been partly counterbalanced by a somewhat well-marked cloud.

H. J. S. (Bedminster).—Although your sitters are not actually staring at the camera, yet they are staring at some object, and have a "know-I-am-being-photographed" look. The mandolin player is evidently more interested in some object other than his instrument. Technically the work is very creditable. The boy's collar comes out too blank white. Your tendency is to carry development a little too far. The far background is in too sharp focus.

J. B. (Doncaster).—Sky part quite excellent. Figures much too dark. Exposure right for sky and distance, but not nearly enough for the nearer dark objects (figures, etc.). The narrow light band of mount is too conspicuous and takes up too much attention. By coating the glass side of the negative with matt varnish where it prints too dark, you might considerably improve the results; also, by using a darker mount these over-dark parts would not be so noticeable.

J. R. R. (Burnley).—Flowers are somewhat too formally arranged and all turned one way, which is not a very natural arrangement. The dark centres suggest that you did not use an iso-plate. This is practically indispensable in such subjects. If using a graduated background, it is generally better to have the lighter part either at the top or on one side—not at the bottom.

T. W. M. (Blisworth).—The simple and dark background behind your figure is a strong point in its favour. There are too many pieces of carving, tools, etc., on the bench. They take our attention away from the figure. The object under the bench is also too light and distracting. Pose of figure is good and natural; lighting a little too strong in contrast. You need a large reflector (*e.g.*, a sheet thrown over a large clothes horse) to throw a little diffused light on the shadow side of the figure.

S. G. K. (Southampton).—The silver print in this case is rather the better of the two (the exception proves the rule). Technically very good—but as all your blossoms are facing one way, they do not look natural. In flower photography, one must aim at naturalness and gracefulness of arrangement as a matter of first importance. The background might have been a shade or two lighter with advantage.

J. B. A. (Belfast).—The river running more or less parallel with the top and bottom of your picture makes a band which seems to cut the composition into two separate parts. The sky is too streaky, and the same general character all over it. For a winter picture the colour is too red—too warm. Technically of fair quality, but with a tendency to too slightly over-strong contrast. You have probably either over-developed or pyro-stained the negative.

H. B. (Leeds).—Careful work and tasteful arrangement, but too black and white—probably the result of a negative over-developed and too strong contrast. The spread-out foreground with ground apparently rising up in No. 2, the result of camera being too far above the level of the road. Try a rapid rough-surface bromide paper with No. 1, and be careful not to over-develop.

M. M. S. (Hull).—1. Shadows too strong and dark; not enough gradation. Picture space over-crowded with too many small objects. 2. Border junctions not quite a good fit. Little more accuracy needed. Rainy day and wet pavement well rendered. 3. Quite the best of your set. Print good. Too many different tints in mount. Horizon too near centre for good pictorial form. This would "come" much better if on a larger scale and rough paper.

S. H. W. (Bristol).—Technically excellent, and also very good example of simple border printing. The edges are not quite straight. When cutting masks use sharp knife, and cut on stout card. Get a *clean* cut. Your subject is not very pictorial. Colour of print good. Careful work like this will soon bring you forward. Pay attention to the pictorial side.

F. C. (Bognor).—Your print is one of the most pictorial sent in to the competition and is of a high order of excellence. Technically slightly faulty. Patch of water too white. Trees just a trifle too dark. Lines on mount round print not quite neat enough. Tint of mount in excellent taste with colour of print.

R. T. K. (Croydon).—Flowers rather too chalky white. Perhaps negative is a little too strong contrast. White line round print on mount is a mistake. See contrast effect of mounts discussed in present volume. Best part the glass vessel, which is excellent. Figure study. Too many objects. Idea good and worth working up. Give longer exposure and develop for delicacy and softness. See Metol, No. 2, page 62 in No. 1 of present series.

J. J. D. (Conway).—Your print is better than average. The view is very well known, therefore not very favourable for a competition when originality counts for something. Shadows a *little* too dark, though doubtless they would look just right when wet. Sky part is blank white paper. Does not suggest any atmospheric effect. Refer to cloud printing in No. 1 of present series for practical instructions.

The Acid Fixing Bath has many supporters. They may be glad to know that Messrs. J. E. Lockyer (Evelyn Street, Deptford) supply card tubes of powders which merely require dissolving in water to yield an acid fixing bath. These tubes, selling at 1½d. for a ten-ounce bath, are just the thing to take away with one when going for a holiday and contemplating developing a few trial exposures.

The Gem Dry Plate Co. (Willesden Green) have sent us for trial and report a varied assortment of plates, ordinary and orthochromatic, varying in H and D speed from 85 to 136. Knowing the care and skill exercised in the manufactures of this enterprising firm, we confidenily expect to find these plates of first-class quality.

Griffin's Cartol Intensifier.—Readers of this number of *The Practical Photographer* will be interested to know that they can obtain an intensifier in two-powder form. The contents of one cartol is dissolved in 4 ozs. of water and an intensifying bath is ready for use. This acts steadily, giving a warm brown or red tinge according to duration of use.

Messrs. Griffin (Sardinia Street, W.C.) some time ago sent us a sample of *Sepol*. We have now had an opportunity of trying it, and find it acts admirably. The two-powder contents of a tube are (easily) dissolved in 4 ozs. of water, and the developer is ready. We find that, by varying the brand of paper, the quantity of bromide and exposure, we have quite a range of colours from a warm black to a rich sepia brown. We thus get a sepia bromide without the trouble of toning baths.

The Kodak Exhibition of Japan subjects (40, Strand, W.C.) should be seen by all interested either in photography or the East. The company will gladly make arrangements for parties or societies at mutually convenient times, and free of charge. Communications to be sent to the Strand address as above.

The Altrincham Rubber Company sends us a neat little price list of shutters, lenses, carrying cases, bags, squeegee pads, rubber focussing cloths, dark-room aprons and other useful things. A copy of this catalogue will be sent post-free on application by anyone mentioning *The Practical Photographer*.

"**Houghtons, Limited,**" is the style and title of the well-known firm of Messrs. George Houghton, 88, High Holborn, now that they have amalgamated with Messrs. Spratt Bros. (Hackney), Messrs. Holmes Bros. (Islington), Messrs. Jackson (Newington), and Messrs. Levi (Hatton Gardens). Mr. George Houghton is chairman and Mr. L. M. Isaacs (Levi & Co.) vice-chairman of the new company. The active management of the amalgamated businesses will remain in the hands of the members of the several firms who have for so many years conducted them so successfully. Mr. E. W. Houghton and Mr. C. E. Houghton will also take an active part in the general management. We have every confidence that this new company has a brilliant future before it, and we offer our congratulations and best wishes for "health, wealth and prosperity."

Fallowfield's Photographic Annual and Comprehensive Catalogue (42nd year) is just to hand. The volume is larger than ever, and indeed is well named a comprehensive catalogue. To turn over the pages of the volume (which run to four figures) is a liberal education itself in the region of photographic apparatus and materials. A book of this kind is indispensable to anyone who wishes to keep abreast with the times, and know what is buyable in the photographic market. A copy will be sent post-free to anyone mentioning *The Practical Photographer* and enclosing 1s. 6d. in P.O. or stamps. N.B.—Foreign readers may be glad to know that foreign stamps to the value of 1s. 6d. will be accepted.

Houghtons, Limited, send us a handy little pocket price list of field cameras, tripods and other useful things that we are all thinking about and wanting just now; also a similar list of hand cameras and companion sundries. These two lists will form desirable supplements to our forthcoming number on Hand Camera Work. They will be sent *gratis* to anyone mentioning *The Practical Photographer*.

Messrs. John Griffin & Sons send us a sample package of some rough bromide paper especially prepared for enlarging purposes. We are glad to see it is of the rough surface kind, and are looking forward to trying it with much interest.

Agfa Reducer.—This is put up in the form of a fine sulphur-yellow granular powder. One part of powder is dissolved in 10 parts of water. To secure even action it is highly desirable to soak a dry negative in water for about ten minutes, before placing it in the reducing bath. It acts steadily and evenly, and takes only three or four minutes for a moderate degree of reduction. One part powder and 15 parts water gives a slower acting bath, which is a convenience when only a slight change is wanted.

Agfa Intensifier comes to us as a water-like solution which merely requires diluting with ten parts water. This is a one-solution bath, so that the plate can be withdrawn at exactly the right moment. If by chance the negative has been over-intensified, it can be reduced again by a bath of hypo 1 part, water 100 parts—say 25 grs. hypo per oz. water. (If there is any difficulty in obtaining these Agfa preparations, communicate with Messrs. Zimmermann, 9 & 10, St. Mary-at-Hill, E.C.)

Messrs. Lumière have sent us a sample of **Formosulphite.** We find this fully justifies its claim to be an efficient and convenient substitute for preservative of alkali. Formosulphite comes to us as a fine, white, easily dissolving powder, and is put up in convenient 1/- bottles.

Quinomet (Metoquinone) comes to us from the same firm. By its name we, of course, guess that it is some blend of quinol and metol, and its action supports this view. But, be the composition what it may, the point most likely to interest our readers is that Quinomet makes a developer that yields a first-rate negative—reminding one of the "good old pyro"—but without the pyro stains.

Mr. Wm. Tylar (Aston, Birmingham), sends us an ingenious yet simply contrived printing frame for printing any part of a quarter-plate negative on any part of a post-card. The arrangement reminds one of the cross front of a camera. This useful bit of apparatus only costs a modest shilling, or post-free, 1/3. The post-card printer will find it a surprisingly good investment.

Messrs. T. H. Powell (116, Denmark Hill) have sent us samples of his pyro soda, and also metol-quinol compressed developer. These are in powder form, contained in flat bottles, with metal screw cap. This cap acts as a measure. A developer can thus be prepared in a moment by simply dissolving a cap-full of the powder in an ounce of water. What could be simpler and more convenient for the tourist or occasional worker? As anticipated, we found these developers keep up to their former and well-known high standard of excellence.

Barnet (yellow sensitive) Orthochromatic Plate.—We have just had the oportunity of trying some of these plates, and out of the first box of a dozen plates have got eleven good and one moderately good negative. This last was our first guess at the exposure, which we slightly under-estimated. Instead of quoting plate speed, one typical exposure will probably be more generally useful. March, 11 a.m., fine but not very bright; subject, yellow flowers and green leaves in a moderately lighted London conservatory, about half glazed with ground glass. Moderately dark yellow colour screen, *f*/16, one minute exposure. Developed with metol according to formula No. 3, page 37, *The Practical Photographer*, No. 6, Developers, etc. With these plates we suggest very thorough fixing if bright negatives are required. The makers recommend the use of pyro-soda carbonate developer.

Messrs. Bayer have sent us a sample of fixing salt destroyer. If 100 grms. of this are dissolved in 35 oz. water (say, 3 grs. per oz. water), and the fixed and washed plate or print be therein immersed, the last traces of hypo will be destroyed in a few moments. We are not informed as to the price of this material, but if it is at all moderate there is no doubt that it will be very generally used.

Mr. Wm. Tylar sends us a small bottle containing a light green liquid called **Ferro Bleach.** This is designed to be used with pen or brush for producing white lines on the blue ground of ferro-prussiate paper. We have tried it and find that it acts quite steadily and evenly, giving a good white or very nearly white line. Two points should be noted. It does not run or spread on the paper, and it does not rot the paper. Those who use ferro-prussiate post-cards will find it invaluable.

The Photographic Arts Journal is now incorporated with *Camera Notes*, and jointly edited by Messrs. Bateman and Curtis.

The Cardiff Horticultural Society are arranging a Photographic Art Section Exhibition for July 27th and 28th, 1904. There are five classes, and a guinea and a half-guinea prize in each class. The Editor of the PRACTICAL PHOTOGRAPHER will officiate as judge. All correspondence to be addressed to Dr. De Vere Hunt, F.R.H.S., Aubrey House. Cathedral Road, Cardiff.

Messrs. R. R. Beard (Peckham) send us a well-illustrated and arranged price list of everything that the lanternist can want—from lanterns to limes—at prices to suit all pockets. When writing for a gratis copy of this list please quote THE PRACTICAL PHOTOGRAPHER. Messrs. Beard make a speciality of assisting inventors with regard to patents, etc. Lantern repairs and alterations are also carried out.

Some New Papers.—We have to thank Messrs. Schaeuffelen, of Heilbronn, for sending us samples of bromide paper in no less than six varieties of surface, *viz.*, Glatt, Rauh, Feinkorn, Grobkorn, Royal and Imperial. We find all these of excellent quality, the Grobkorn surface being quite charming for broad soft effects. We are not aware if this paper is obtainable in England, but venture the opinion that it has only to be known to become widely appreciated.

Messrs. Edmeades & Co. (Peckham) have sent us a sample of "Wesner" plates. The point about these plates is that they are said to give orthochromatic effects without the use of a colour screen. We hope to have an early opportunity of trying these plates and reporting in a forthcoming number.

The twenty-fifth annual issue of **The Year's Art** is to hand, and impresses us as a worthy successor to its two dozen predecessors. Among the illustrations are a capital portrait (from a photograph of John Singer Sargent, R.A.), a portrait of the Editor, A. C. R. Carter (from a painting), and the four world famous Bouchers, which fetched over 22,000 guineas at the *Vaile* sale. This volume should certainly be found among the works of reference in every Photographic Society's Library.

Half-Tone Process, by Julius Verfasser (Iliffe & Sons). A clearly written, well arranged practical handbook for the maker of half-tone blocks for the press. The first section is devoted to the studio, dark-room, apparatus, etc. The second deals fully with practical operations from pinning up the copy to mounting the block. The three-colour process is dealt with, and two examples given. The volume runs to close on 300 pages, and includes over 100 illustrations. All concerned are to be congratulated.

From Messrs. B. J. Edwards (Ealing Dean) comes a tastefully arranged catalogue of plates, films, colour screens, developers, etc. This booklet contains numerous little pictures and quite a long array of thoroughly practical developing and other formulæ. Edwards' plates and films have long been known as of first-class quality, and have many exclusive users. A copy of the catalogue will be sent to correspondents mentioning *The Practical Photographer.*

The National Photographic Record Association will be glad to hear from anyone possessing negatives of objects such as this association concerns itself with. The council have made arrangements for the printing of such negatives that may be lent for this purpose. Those desiring to help forward this most laudable society should in the first instance send, *not* the negatives, but a list of the subjects, to Mr. George Scamell, 21, Avenue Road, Highgate, London, N., the Hon. Sec. of the society, so that proper arrangements may be made. Every possible care will be taken of any negatives loaned to the society, but the council cannot hold themselves responsible for any damage.

Messrs. Butcher & Sons are inaugurating a monster competition in connection with the use of Coxin. Sixty-eight prizes will be given, ranging in value from a Humber motor bicycle, a Riley's combined billiard and dining table, to cameras at various prices.

Messrs. Elliott & Sons (Barnet) have arranged a most tempting and fascinating competition, or rather group of competitions. Prizes to the amount of £500 will be distributed over a considerable number of classes. For details apply to the firm, or any respectable photographic dealer.

Professional and Trade Advertisements.

ADVERTISEMENTS OF PHOTOGRAPHIC BUSINESSES FOR SALE AND WANTED, SITUATIONS WANTED AND VACANT, MISCELLANEOUS, PROFESSIONAL AND TRADE ANNOUNCEMENTS are inserted at the rate of one penny per word, minimum 1/-.

The "Nature" Series of Mounts.

The system of mounting on stout paper instead of cardboard is fast gaining ground on account of its manifold advantages, viz.: smaller space occupied, greater ease in storing, with less wear and tear, infinite variety possible, and more tasteful appearance of the photographs. 'Nature' Papers are admirably adapted for the new American System of mounting, for passe-partouts, etc. Two thicknesses can be obtained. In order to mount without cockling, use very stiff paste, spread sparingly, roll well with squeegee, and place under a board or book. These papers may be had in the sheet or in cut sizes. Prices below. Portfolios for holding prints mounted on cut sizes are made. See price list below.

In 1/0 Packets.

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Ordinary Thickness. Contains No. sheets 8×6 in.			Extra Thick Series. Contains No. sheets 8×6 in.	
A	48	assorted colours	A0	32
A1	48	grosvenor green	A01	32
A2	48	duffel gray	A02	32
A3	48	gray bark	A03	32
A4	48	playfield cream	A04	32
A5	48	rough white	A05	32
A6	48	dove	A06	32
A7	48	deep sea blue	A07	32
A8	48	autumn brown	A08	32
A9	48	smoke gray	A09	32
A10	48	fern green	A010	32
A11	48	coffee	A011	32
A12	48	wine red	A012	32
A13	48	black	A013	32
A14	48	olive green	A014	32
A15	48	iron gray	A015	32
A16	48	russet	A016	32

To take sizes up to ¼-plate.

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B	36	assorted colours	B0	24
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B2	36	duffel gray	B02	24
B3	36	gray bark	B03	24
B4	36	playfield cream	B04	24
B5	36	rough white	B05	24
B6	36	dove	B06	24
B7	36	deep sea blue	B07	24
B8	36	autumn brown	B08	24
B9	36	smoke gray	B09	24
B10	36	fern green	B010	24
B11	36	coffee	B011	24
B12	36	wine red	B012	24
B13	36	black	B013	24
B14	36	olive green	B014	24
B15	36	iron gray	B015	24
B16	36	russet	B016	24

To take sizes up to ½-plate.

Ordinary Thickness. Contains No. sheets 12×10 in.			Extra Thick Series. Contains No. sheets 12×10 in.	
C	24	assorted colours	C0	16
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C2	24	duffel gray	C02	16
C3	24	gray bark	C03	16
C4	24	playfield cream	C04	16
C5	24	rough white	C05	16
C6	24	dove	C06	16
C7	24	deep sea blue	C07	16
C8	24	autumn brown	C08	16

To take sizes up to ½-plate.

Ordinary Thickness. Contains No. sheets 12×10 in.			Extra Thick Series. Contains No. sheets 12×10 in.	
C9	24	smoke gray	C09	16
C10	24	fern green	C010	16
C11	24	coffee	C011	16
C12	24	wine red	C012	16
C13	24	black	C013	16
C14	24	olive green	C014	16
C15	24	iron gray	C015	16
C16	24	russet	C016	16

The Ordinary Papers are also supplied in large sheets (28×26 in.), price **2/6** per quire.
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Printed for the Proprietors, Messrs. Hodder & Stoughton, 27, Paternoster Row, London, E.C., by Percy Lund, Humphries & Co., Ltd., The Country Press, Bradford; and 3, Amen Corner, London, E.C.